

# PERMANENT WAY ROLLING STOCK

AND  
TECHNICAL WORKING  
OF  
**RAILWAYS.**

---

FOLLOWED BY AN APPENDIX ON **WORKS OF ART,**

BY

CH. COUCHE,

Inspector General of Mines, Professor of Railway and General Construction at the School of Mines, Paris,  
etc., etc.

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VOLUME I, WITH ATLAS OF 38 PLATES

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TRANSLATED FROM THE FRENCH

BY

JAMES N. SHOOLBRED. — B. A.

Mem Inst. C. E. — F. G. S.

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ATLAS

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# PLATES

## THE FIRST VOLUME

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# PERMANENT WAY

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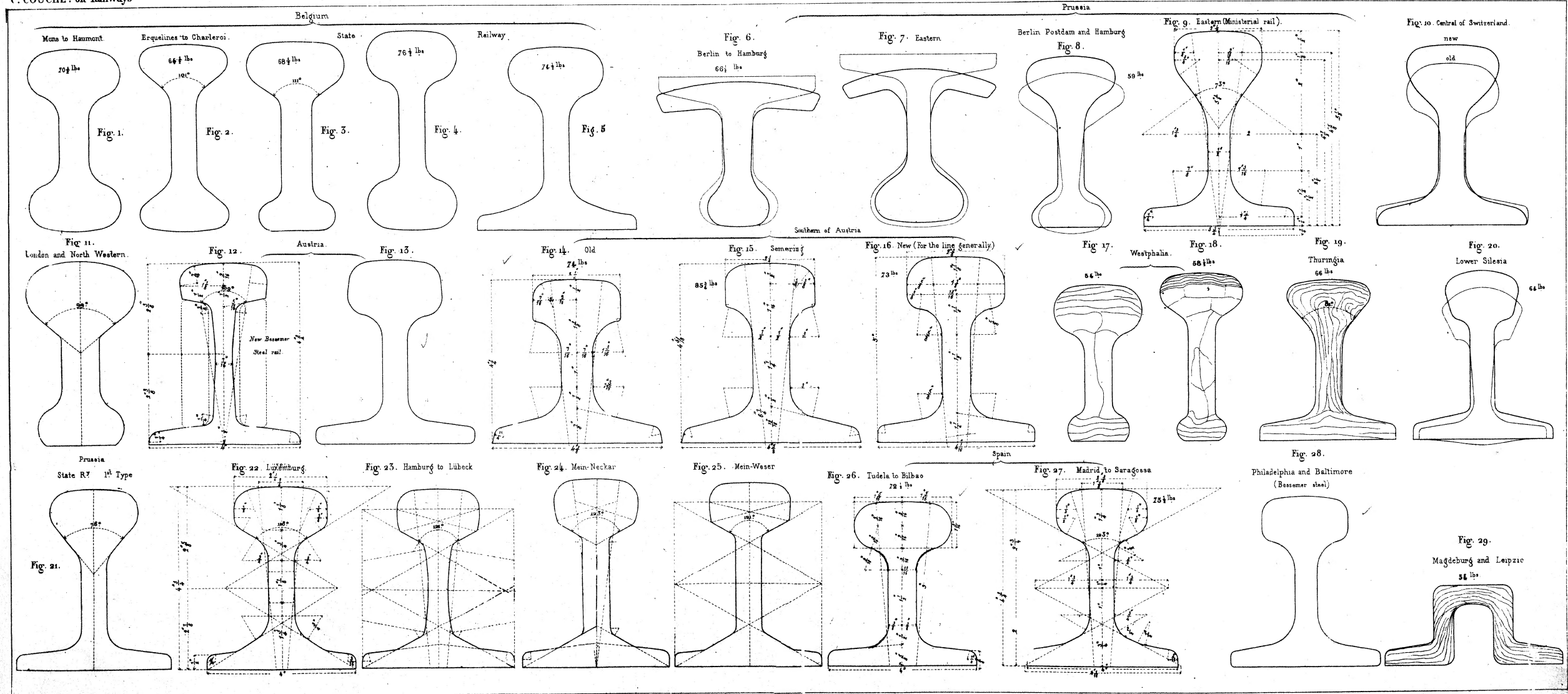
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Pl. II. — Sections of rails.  
Pl. III. — Sections of rails. — Distribution of cant in curves.  
Pl. IV. — Joint-fastenings.  
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Pl. VI. — Joint-fastenings. — Longitudinal Sleepers.  
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- Pl. XXXV. — Drainage of Cuttings, Embankments and Tunnels.
- Pl. XXXVI. — Connection between Railways at Battersea, near London.
- Pl. XXXVII. — Locking Apparatus for Point and Signal levers.
- Pl. XXXVIII. — Supplement.





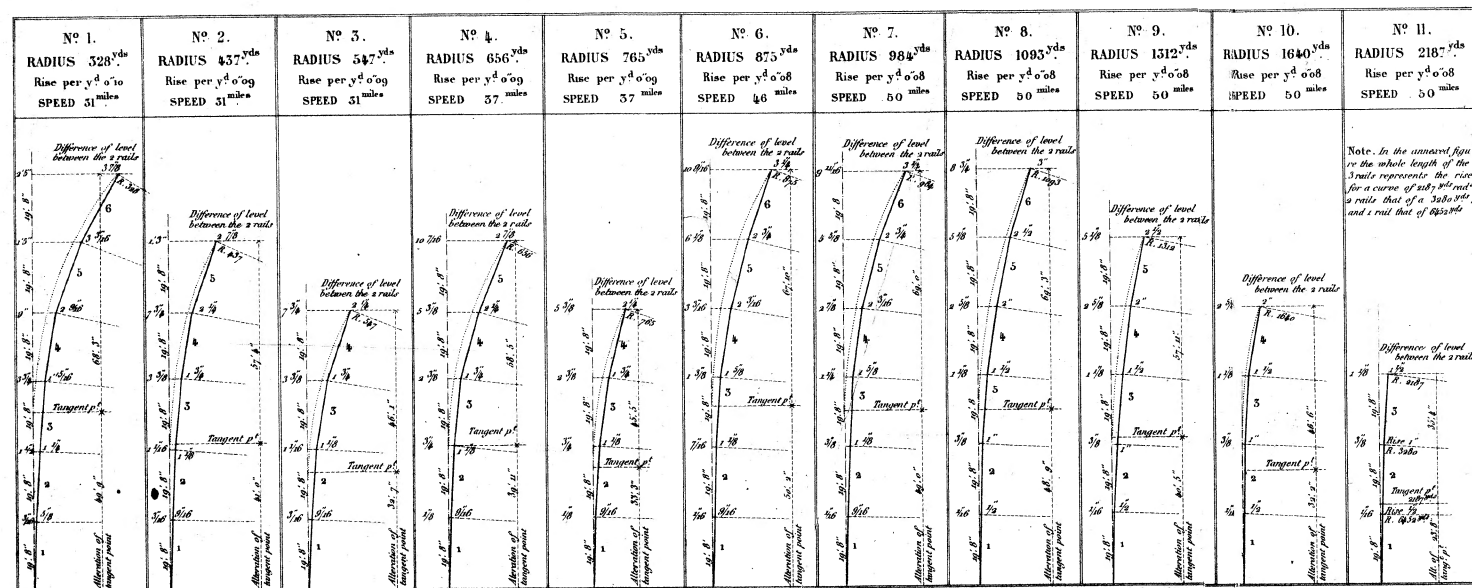






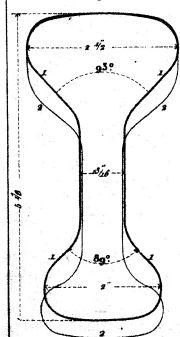
C. COUCHE, on Railways.

Fig. 1.



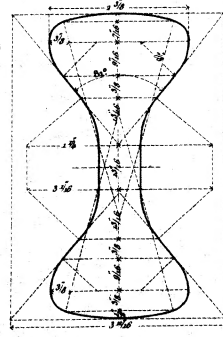
Paris to Mulhouse.

Fig. 7.



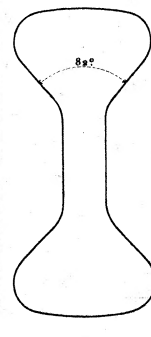
Bourbonnais Nevers to Roanne.

Fig. 8.



Orléans extension.

Fig. 9.



Eastern of Prussia.

Fig. 10.

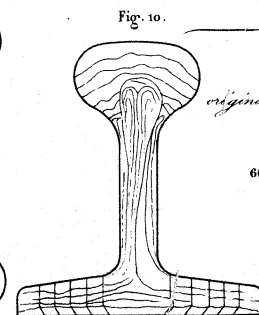
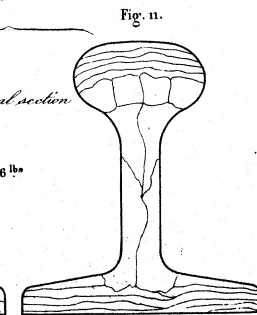


Fig. 11.



Eastern of France.

Fig. 12.

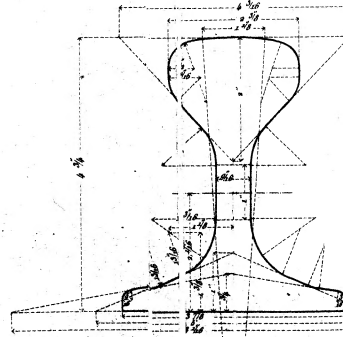


Fig. 13.

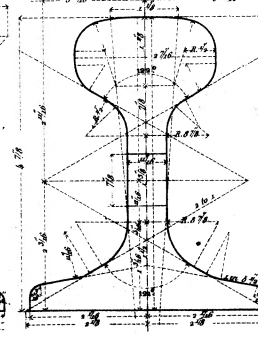
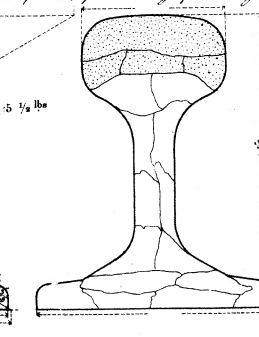
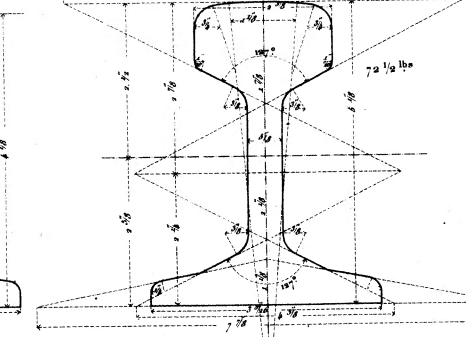


Fig. 14.



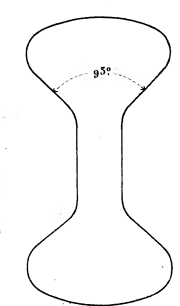
Bourbonnais. Moulins to Nevers.

Fig. 15.



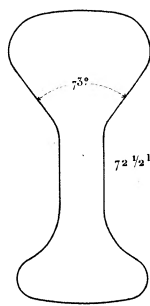
Paris Suburban.

Fig. 2.



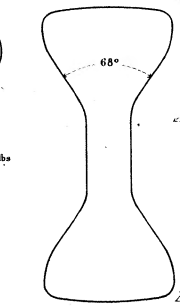
Mediterranean Rhone and Loire.

Fig. 3.



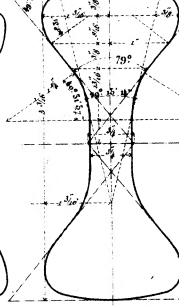
Paris and Strasbourg.

Fig. 4.



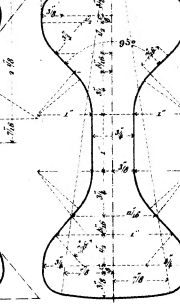
Paris and Lyons.

Fig. 5.



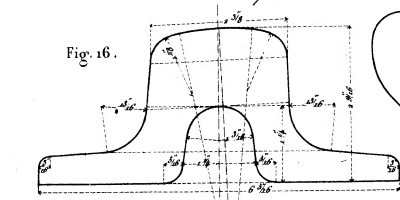
Western of France.

Fig. 6.



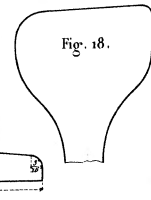
Paris and Lyons.

Fig. 16.



Rail proposed by M. Ducloux.

Fig. 18.



Eastern of France.

Fig. 17.

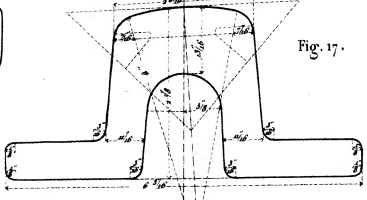
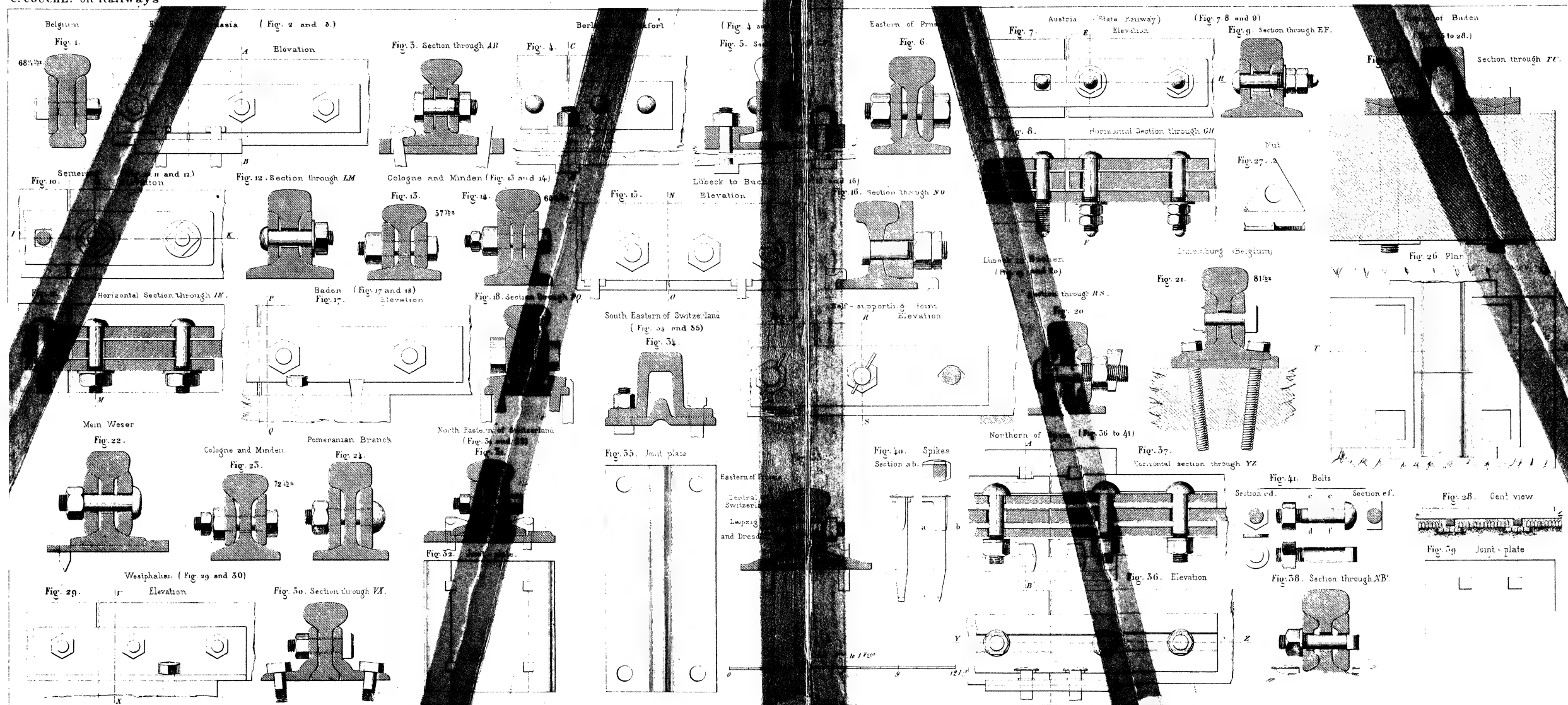


Fig. 2 to 18 Scale 1/4" to 1 Foot.

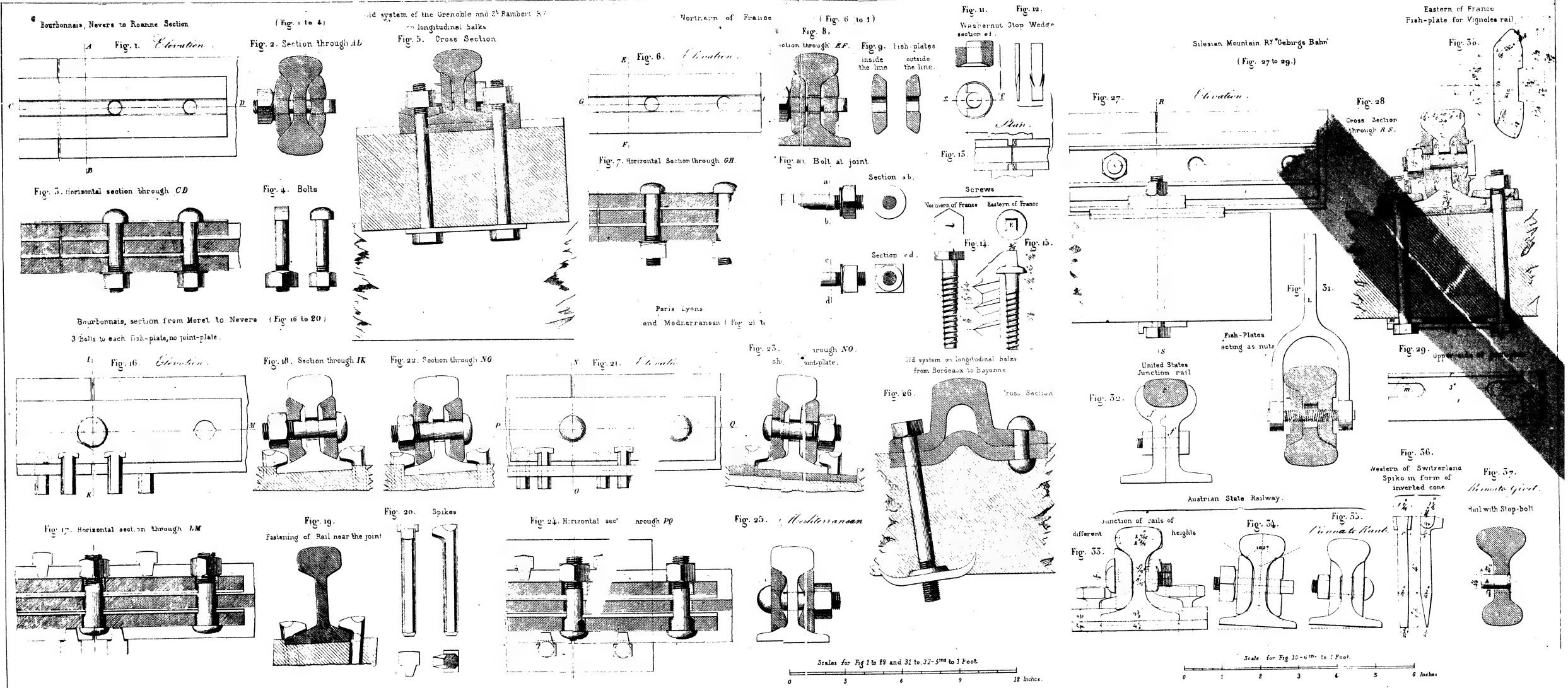






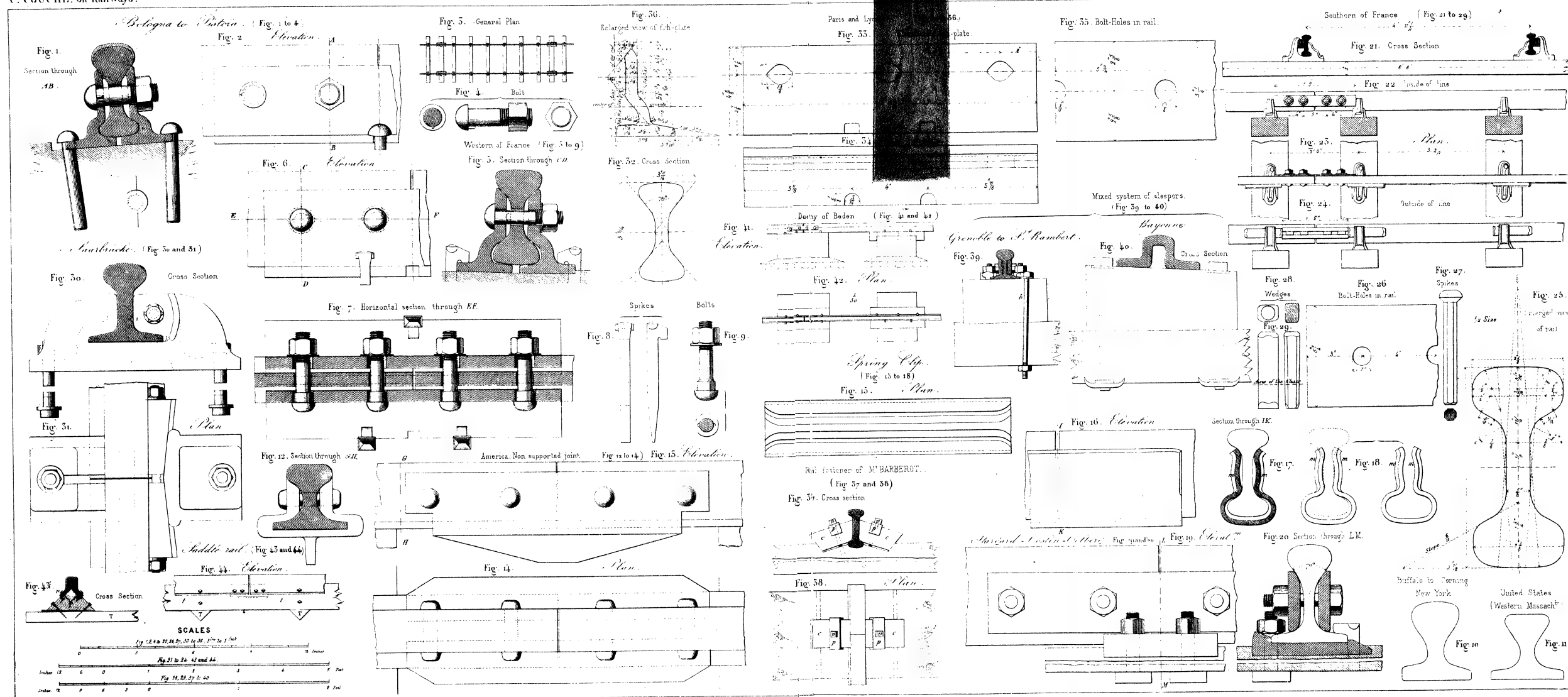


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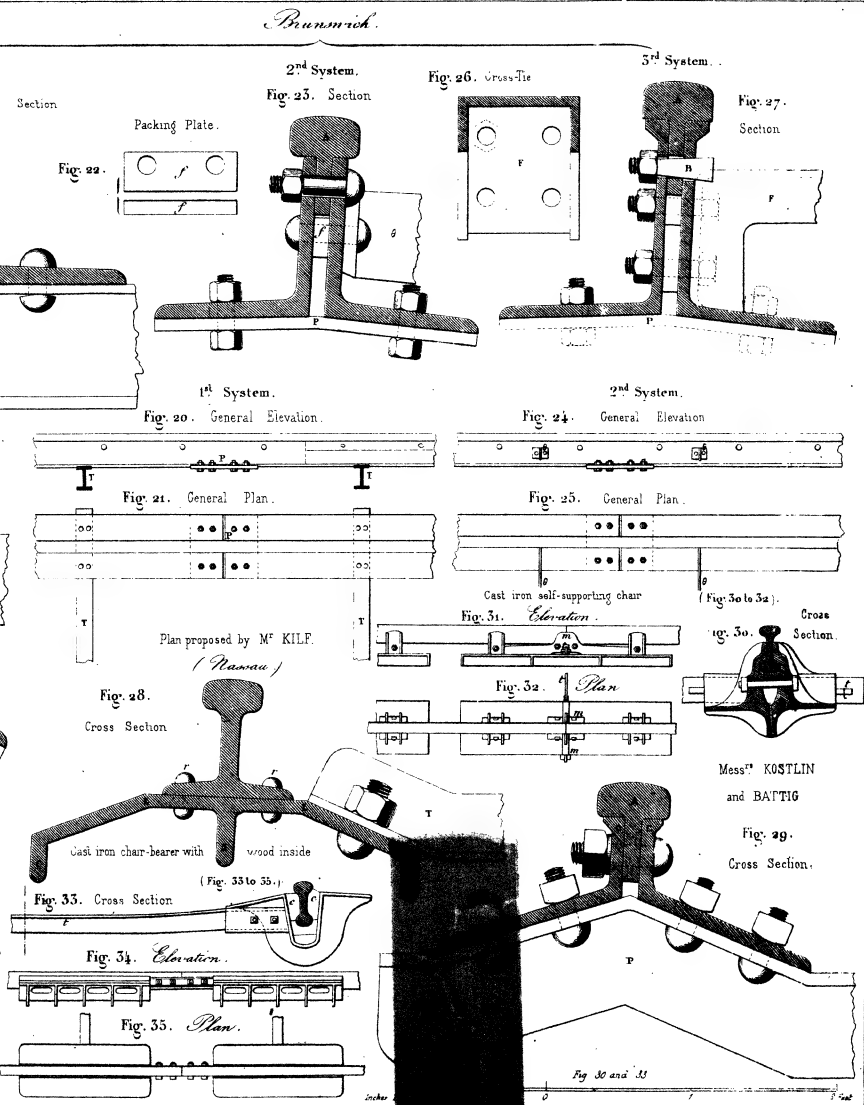
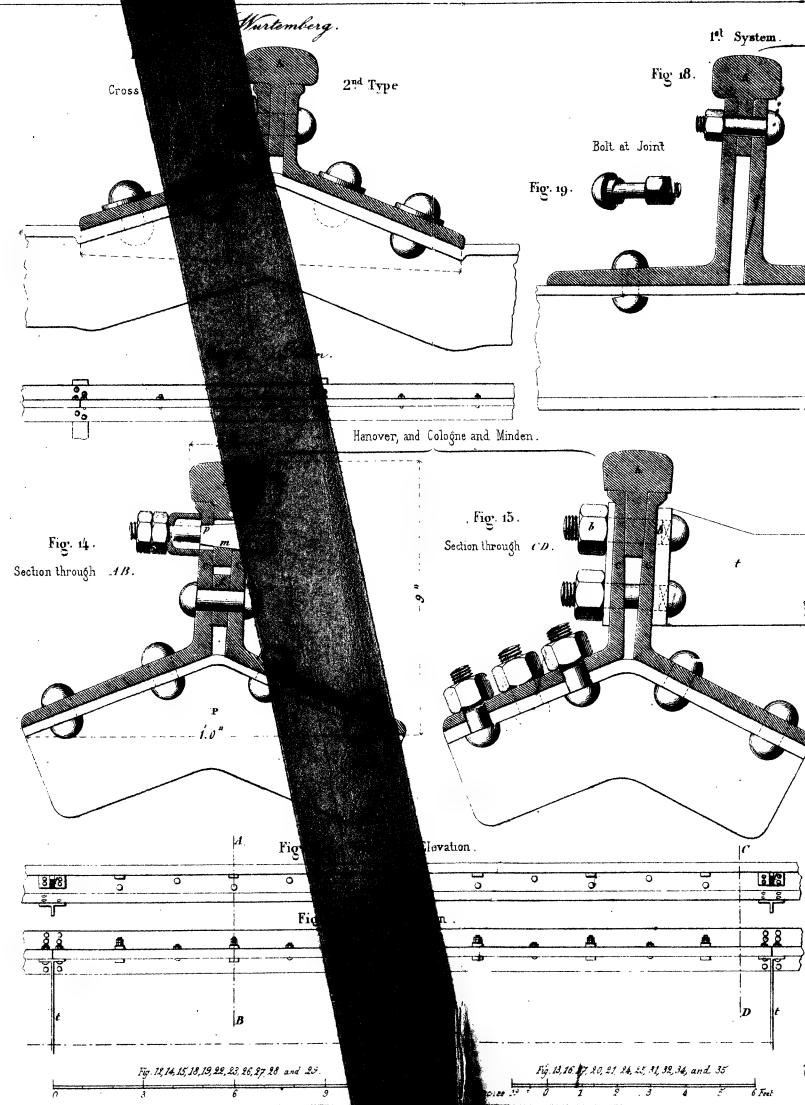
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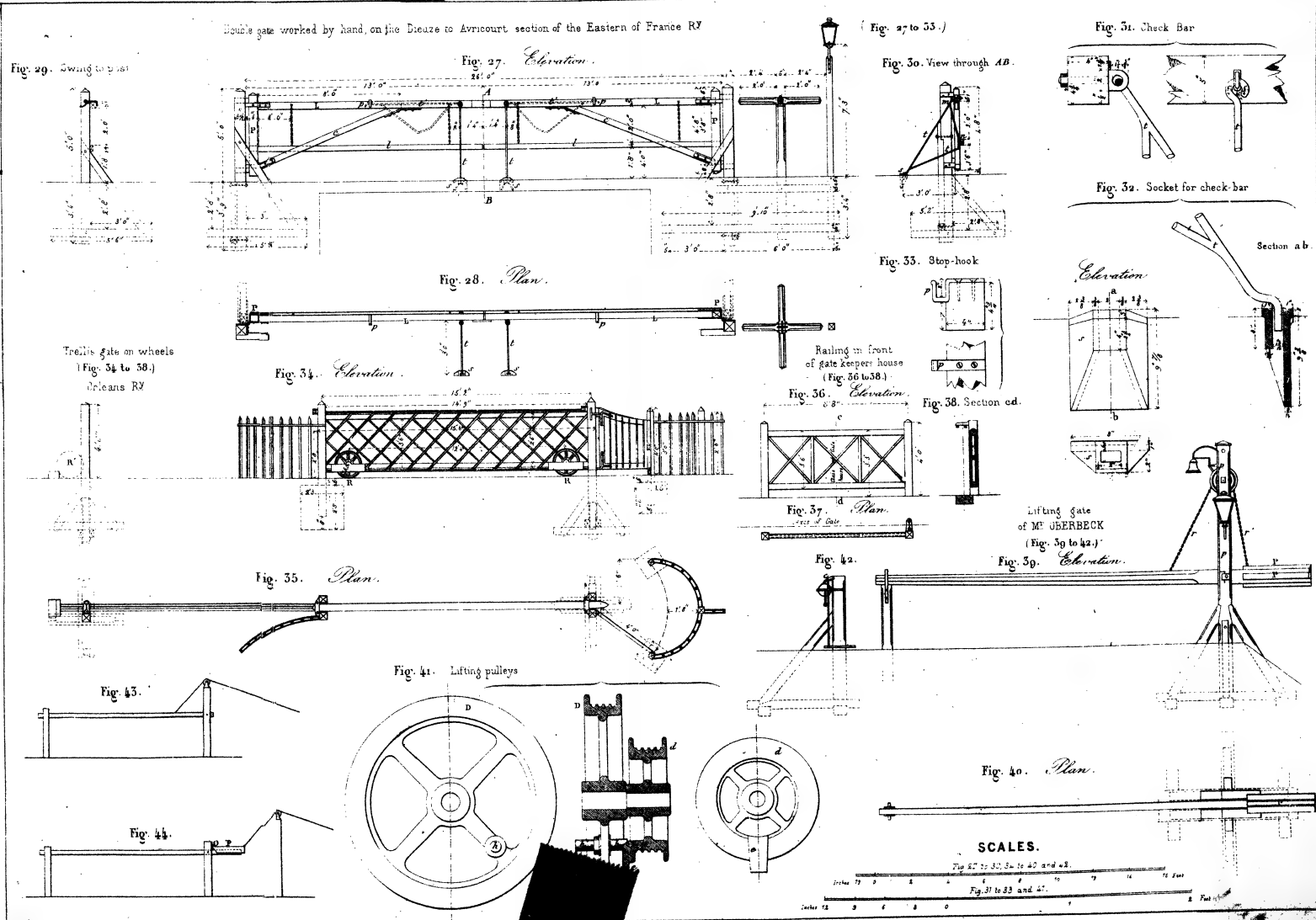












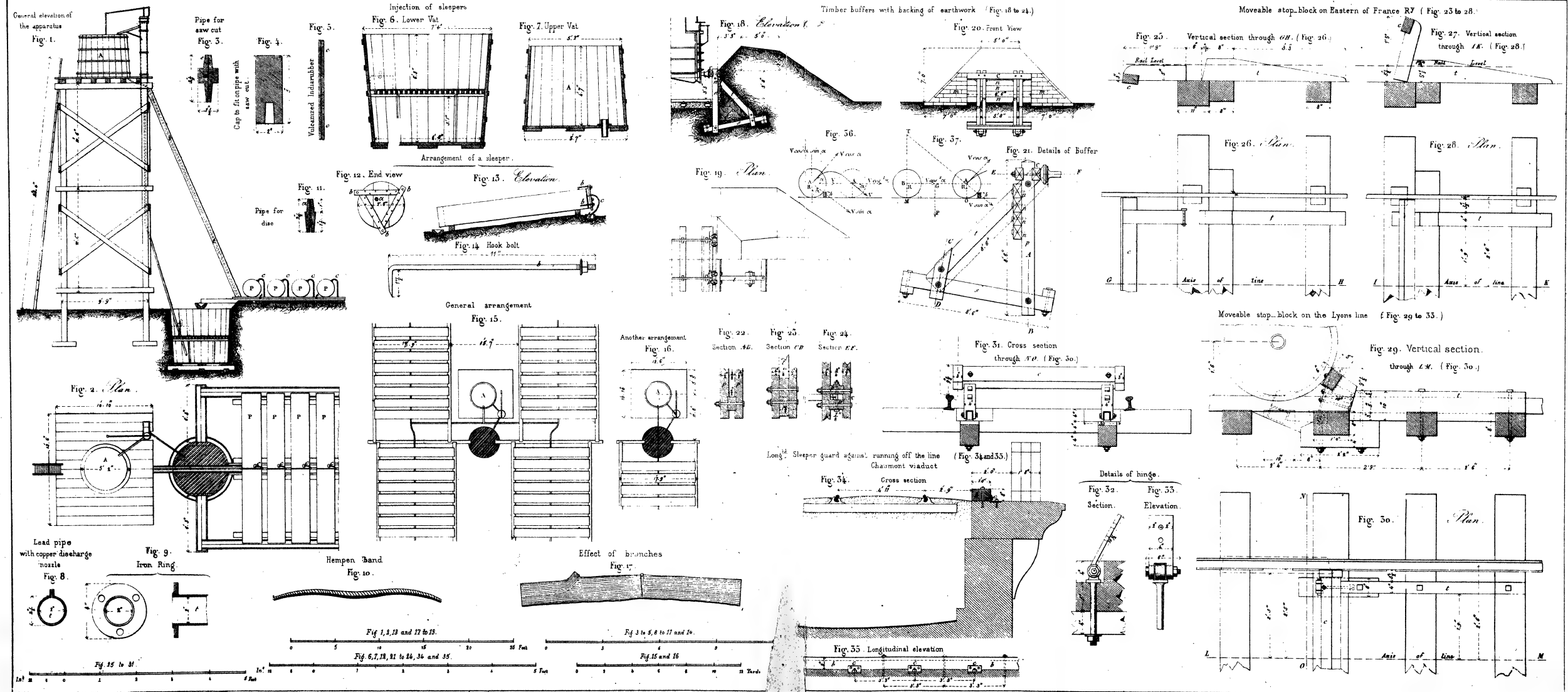




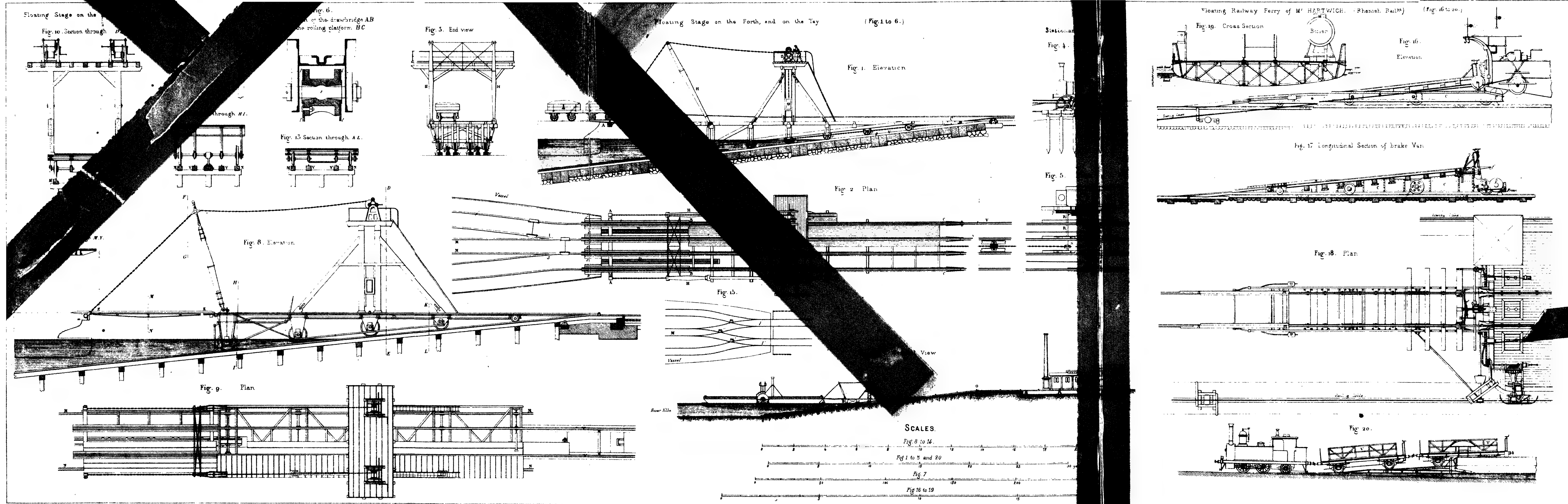




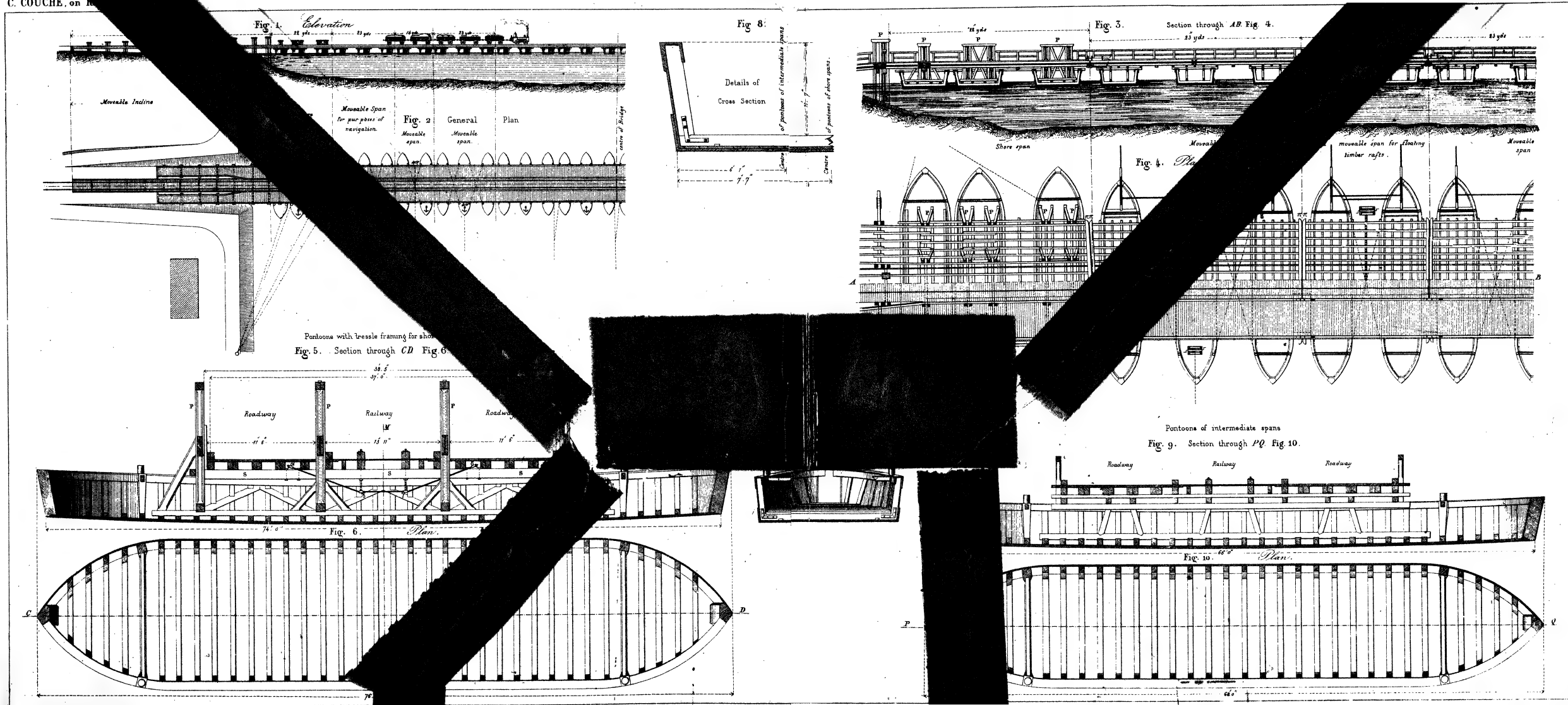
C. COUCHE on Railways.













Longitudinal Section, & Elevation  
& of the working appar

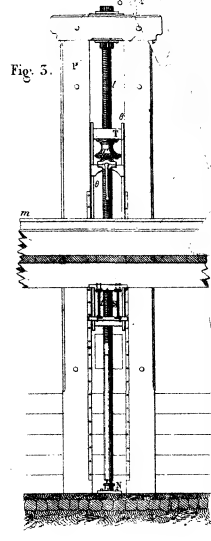


Fig. 5. *Eleva*

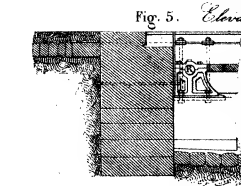


Fig. 6.

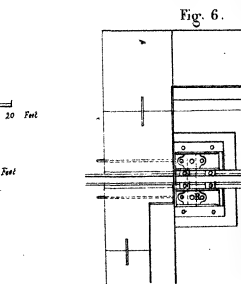
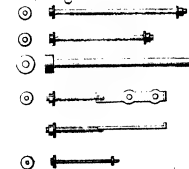


Fig. 1 to 3, 5 to 14 and 20 to 22.

Fig. 4 and 15 to 19.

Fig. 23 and 24.

Fig. 24. B



Arrangement at junction of first pontoon  
with last fixed support (Fig. 20 to 22.)

Fig. 20.  Plan.

Fig. 21.  Elevation

Fig. 19

[illegible]

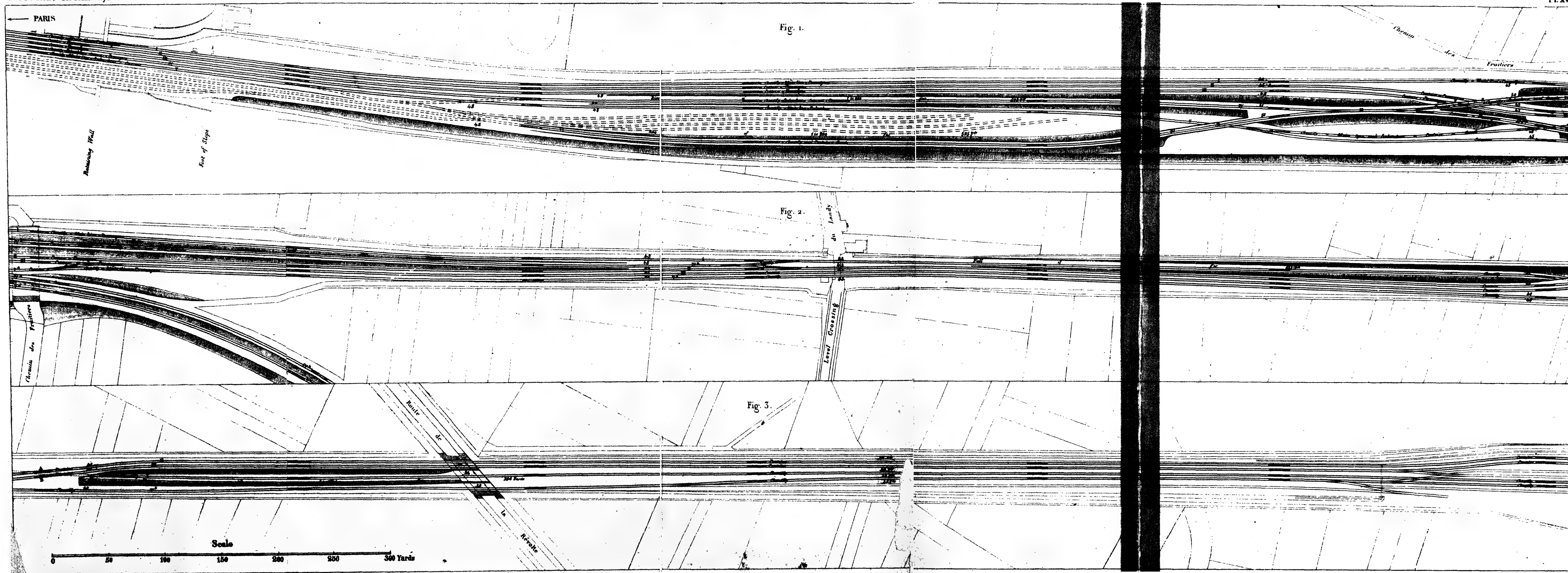
Fig. 22.  Section

Fixed clamping hooks & bolts  
for long balks

Fig. 23.

















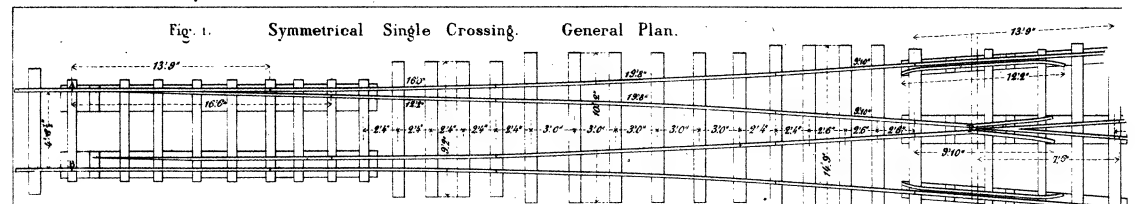


Fig. 2. Skeleton Plan. Single Crossing.

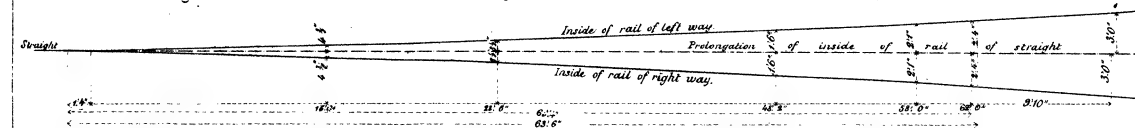


Fig. 3. Three throw switch and Crossings. General Plan.

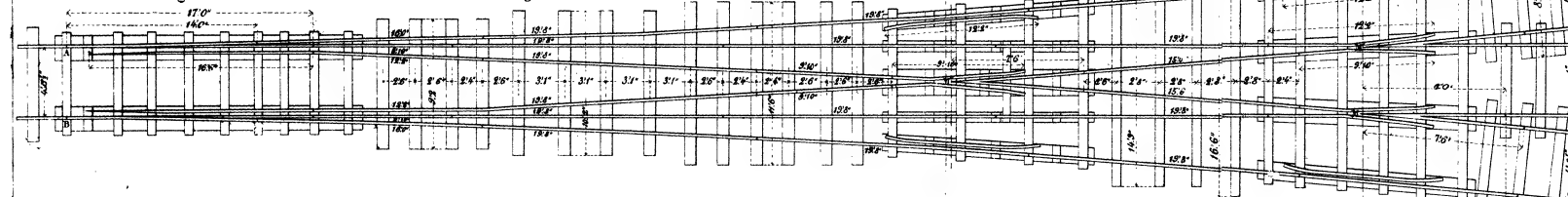


Fig. 4. Skeleton Plan. Three-throw switch and Crossings.

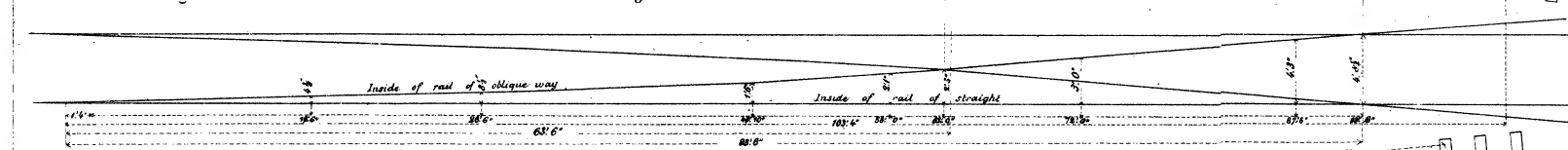


Fig. 5. Left hand single Crossing (the right hand way is straight.) General Plan.

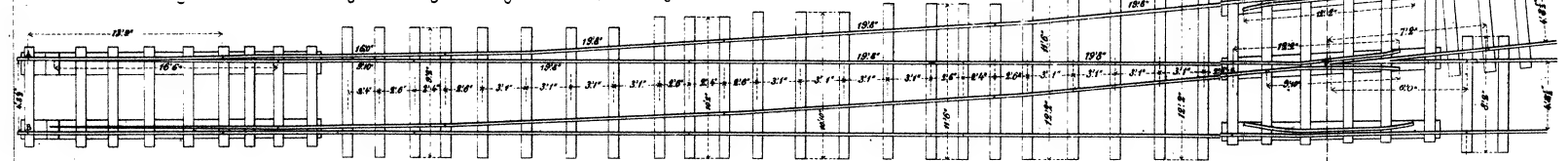


Fig. 6. Skeleton Plan. Single Crossing

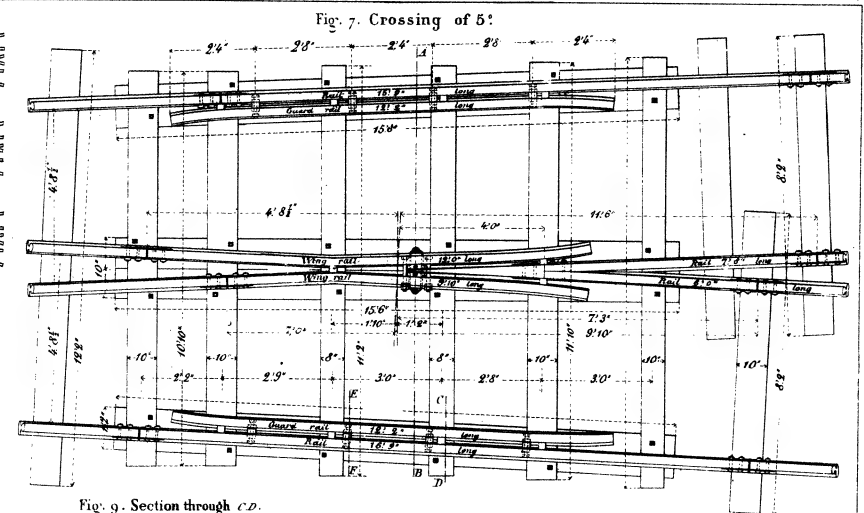
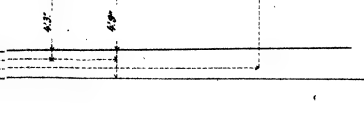
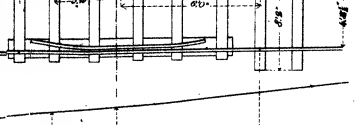
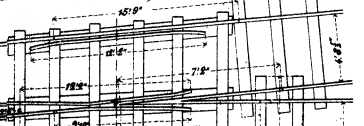
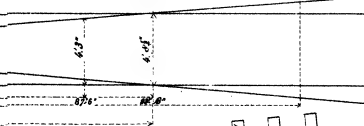
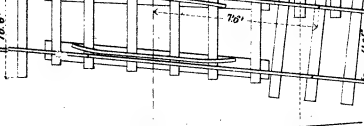
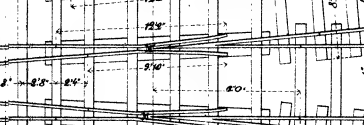
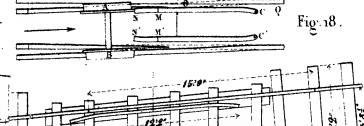
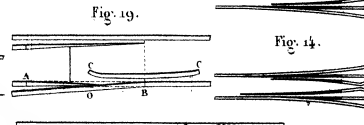
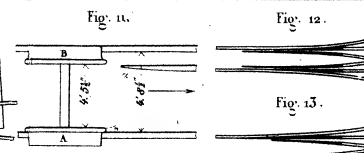
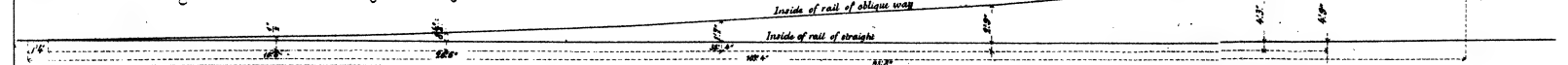


Fig. 9. Section through C.D.

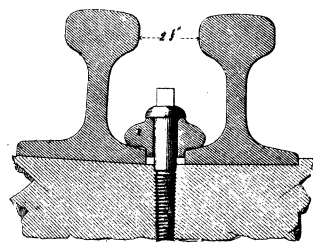
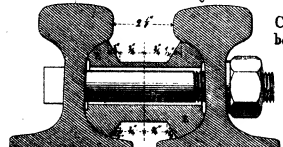


Fig. 8. Section through A.B.



Fig. 10. Section through E.F.



Cast iron block  
between rail and  
guard rail.

Fig. 16.

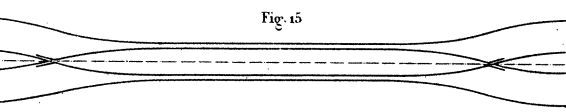


Fig. 15.

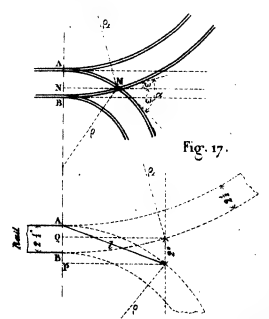
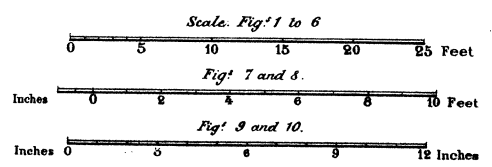


Fig. 17.

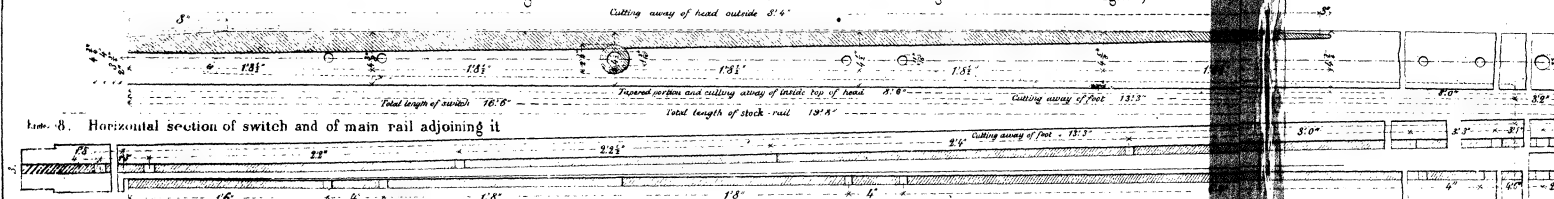




## Eastern of France. Details of single crossing (Fig. 1 to 8)

Fig. 7. Section of left hand switch, inside of line (the right hand switch is straight)

Cutting away of head outside 3' 4"



End view of switch and of main rail adjoining it

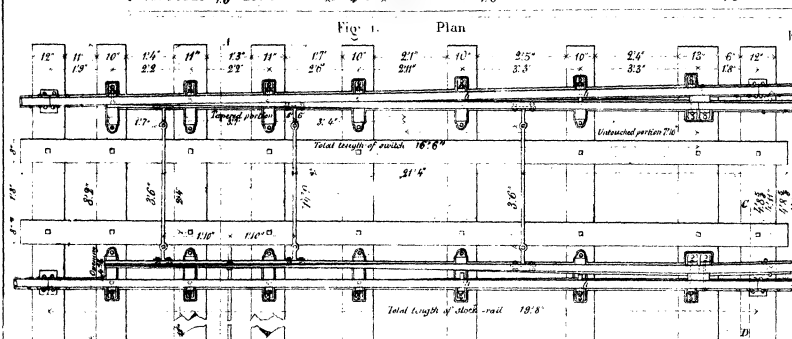
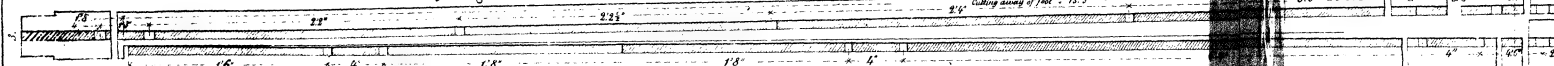


Fig. 5. Section on line C.D. Austrian State R. Working lever

Fig. 17. End view

Fig. 18. Side view

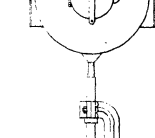
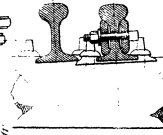


Fig. 2. Section on line 1.A. 6' 10"

Fig. 4. Switch point

Fig. 3. Section

End view

Fig. 20.

With moveable  
Counterswitches  
Southern of France - R.

(Fig. 20 and 21.)

Side view

Fig. 21.

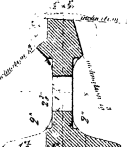
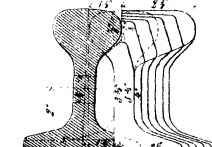
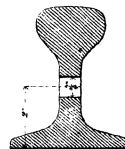
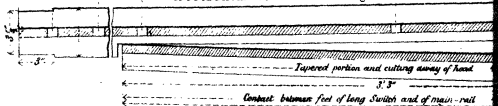


Fig. 6. Section through bolt hole



Horizontal section showing bolt holes in main rail



## Eastern of France. Details of three throw switch (Fig. 9 to 16)

Fig. 9.

Plan

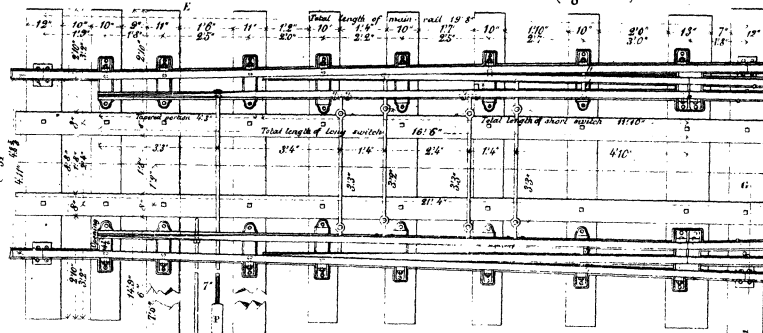
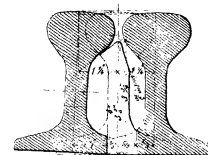
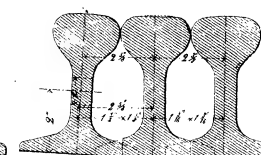
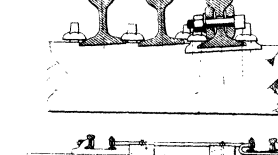
Fig. 12.  
Section at point  
of short switch.Fig. 13.  
Section at contact of switches

Fig. 11. Section on line 6.H.



Section on line 4.F.

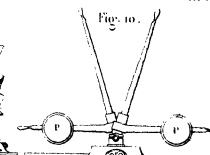
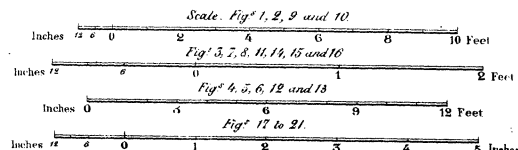
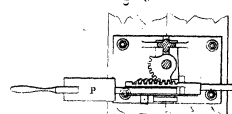
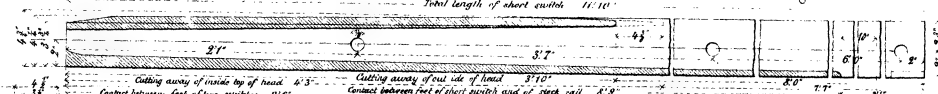


Fig. 19. Plan



Elevation of right hand short switch, outside the line (the left hand short switch is straight)



Elevation of right hand long switch outside of line.

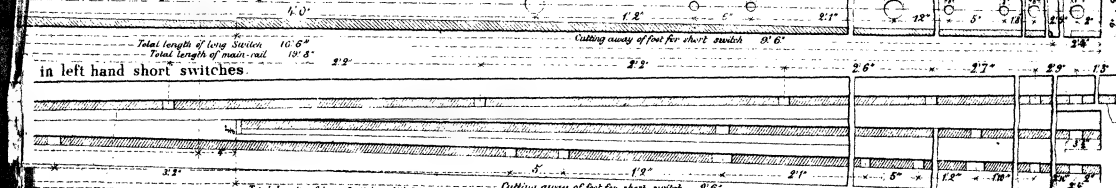


Fig. 14.

Fig. 15.







5°30' Crossing, Eastern of France R<sup>y</sup>. (Fig<sup>s</sup> 1 to 9.)

Fig. 2. Section of framework along AB

Fig. 1. Plan

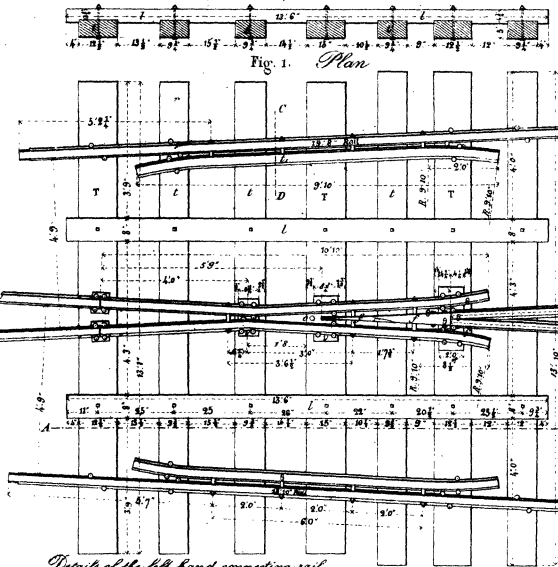


Fig. 3. Section along CD

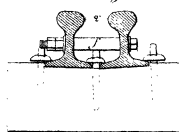
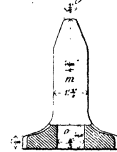


Fig. 4. Section through the point



Details of the left hand connecting-rail, the right hand one is symmetrical.

Fig. 6. Outside Elevation

Fig. 7. Horizontal Section

Details of the crossing point

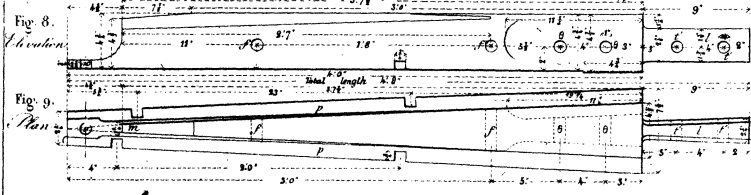
Scale—Fig<sup>s</sup> 1, 2, 29, and 33.  
Inches 0 1 2 3 4 5 6 7 8 9 10 Feet  
Fig<sup>s</sup> 4, 5, 40, 41, and 49.  
Inches 0 1 2 3 4 5 6 7 8 9 10 FeetDouble-faced cast-steel crossing of 5°30' for double headed rail (Marall, Chwell, and Toulot). (Fig<sup>s</sup> 10 to 16.)

Fig. 11. Section along EF

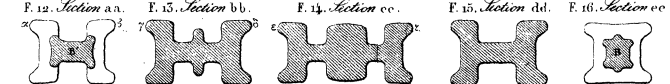
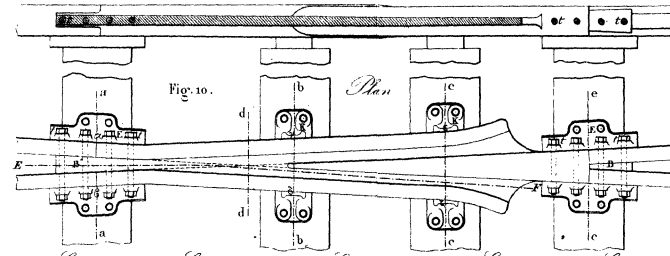
Messrs. Vickers & Co. Sheffield—Cast-Steel crossing of 5°30' for Eastern of France R<sup>y</sup>. (Fig<sup>s</sup> 17 to 21.)

Fig. 18. Elevation

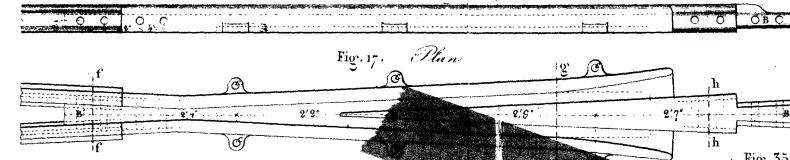


Fig. 19. Section ff

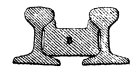


Fig. 20. Section gg

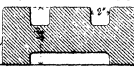
Cast-steel crossing for hognols-rail (Fig<sup>s</sup> 22 to 28.)

Fig. 23. Section along GH

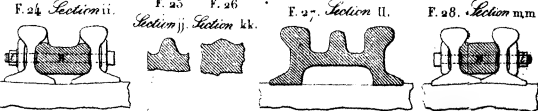
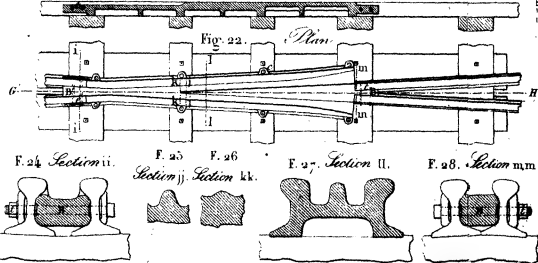
Guscon cast-crossing of 5°30' (Eastern of France R<sup>y</sup>). (Fig<sup>s</sup> 29 to 32.)

Fig. 30. Section along IK

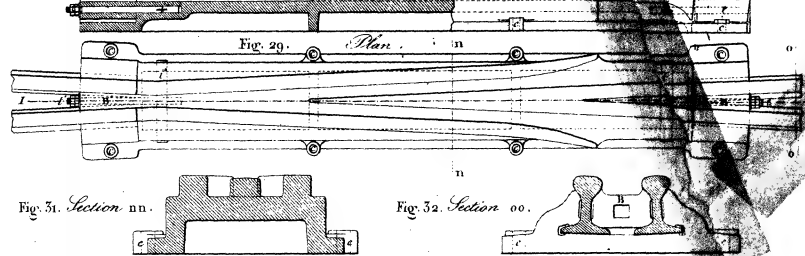


Fig. 31. Section nn



Fig. 32. Section oo

Double-faced cast-steel crossing of 5°30' for hognols-rail (Marall, Chwell, and Toulot). (Fig<sup>s</sup> 33 to 38.)

Fig. 35. Section pp



Fig. 36. Section qq

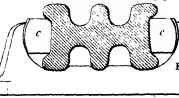


Fig. 37. Section rr

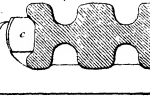


Fig. 38. Section ss

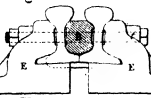
Hammered cast-steel crossing of 5°30' (Western of France R<sup>y</sup>). (Fig<sup>s</sup> 44 to 46.)

Fig. 45. Section along NOP

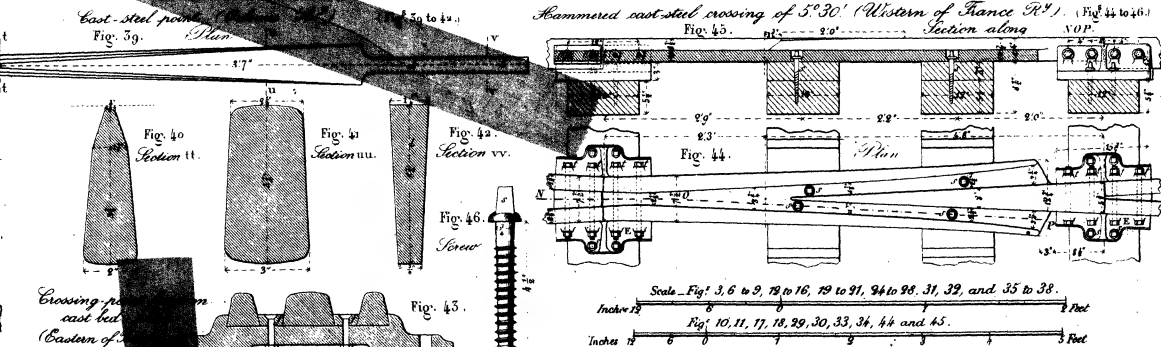


Fig. 40. Section tt



Fig. 41. Section uu



Fig. 42. Section vv



Fig. 46. Screw

Crossing-point cast-steel (Eastern of France R<sup>y</sup>)Scale—Fig<sup>s</sup> 3, 6 to 9, 19 to 21, 24 to 26, 31, 32, and 35 to 38.  
Inches 0 1 2 3 4 5 6 7 8 9 10 Feet  
Fig<sup>s</sup> 10, 11, 17, 18, 29, 30, 33, 36, 44 and 45.  
Inches 0 1 2 3 4 5 6 7 8 9 10 Feet



C. COUCHE. On Railways

*New Van der Ebbe Points, dispensing with tapering away of switch tongue*  
(Fig. 1 to 16.)

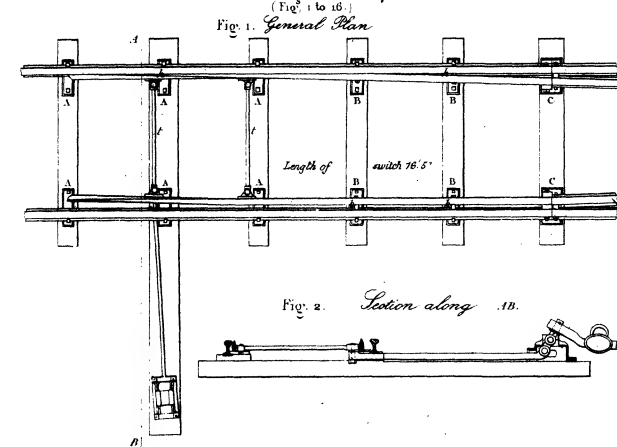


Fig. 2. Section along AB.

Fig. 3.

Section of chair A.

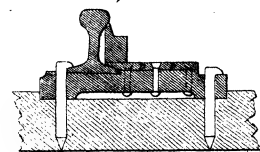


Fig. 4. Plan.

Fig. 7.

Section of chair C.

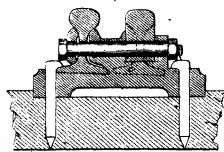


Fig. 8. Plan.

Fig. 5. Section of chair B.

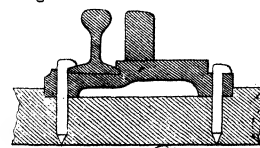


Fig. 6. Plan.

Fig. 11.

Section aa.

Fig. 12.

Section bb.

Fig. 13.

Section cc.

Fig. 14.

Section dd.

Fig. 15.

Section ee.

Fig. 16.

Section ff.

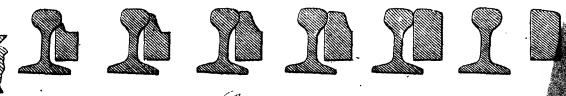
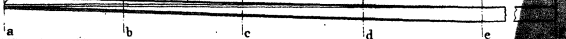


Fig. 9. Elevation of switch.

Fig. 10. Plan.



*Chain and fishplates for heel of switch*  
*Right hand switch and its stock rail*  
*Left hand switch and its stock rail*

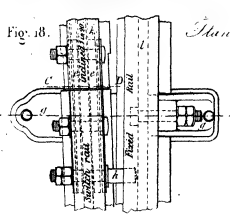
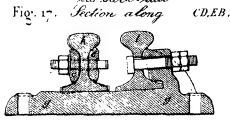


Fig. 18. Plan.

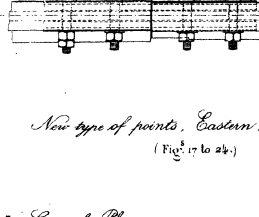
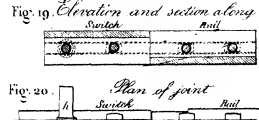
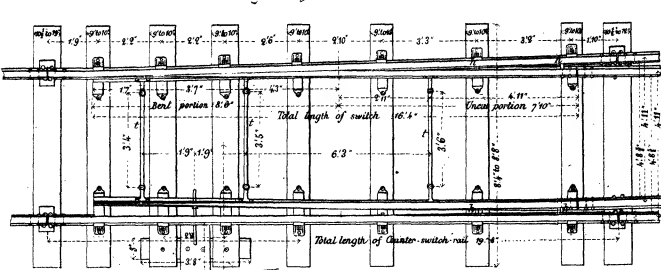


Fig. 20. Plan of joint.

*New type of points, Eastern of France R?*  
(Fig. 17 to 24.)

Fig. 25. General Plan.



*Points of switch rail and of counter-switch rail, Northern of France R?* (Fig. 34 to 37.)

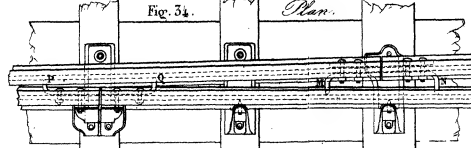


Fig. 34. Plan.

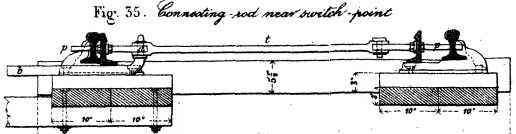


Fig. 35. Connecting rod near switch-point.

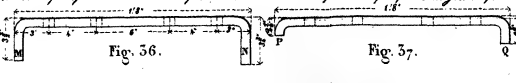


Fig. 36.

Fig. 37.

*Fish-plate*

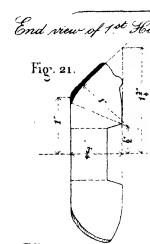


Fig. 21. End view of 1st Half.

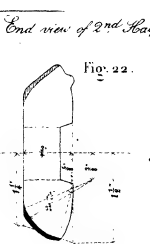


Fig. 22. End view of 2nd Half.

*Through crossing*

*Height of Guard-rail*

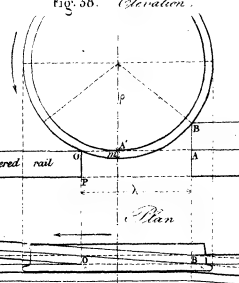


Fig. 38. Elevation.

*Plan*

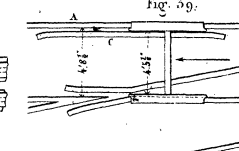


Fig. 39. Plan.

*Points on the Paris, Lyons, and Mediterranean (Fig. 25 to 33 and 40.)*

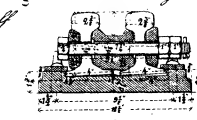


Fig. 26. Section along GH.

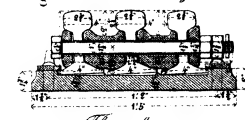


Fig. 28. Section along IK.

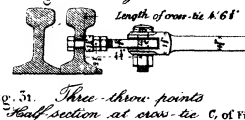


Fig. 30. Single Points.

*Single points*

*Right hand switches, heel connections*

*Left hand switches, heel connections*

*Plan*

*Section at cross-tie C, of Fig. 40.*

*Length of cross-tie 4'6".*

*Section at cross-tie B, of Fig. 40.*

*Length of cross-tie 4'6".*

*Section at cross-tie A, of Fig. 40.*

*Length of cross-tie 4'6".*

*Section at cross-tie D, of Fig. 40.*

*Length of cross-tie 4'6".*

*Section at cross-tie E, of Fig. 40.*

*Length of cross-tie 4'6".*

*Section at cross-tie F, of Fig. 40.*

*Length of cross-tie 4'6".*

*Section at cross-tie G, of Fig. 40.*

*Length of cross-tie 4'6".*

*Section at cross-tie H, of Fig. 40.*

*Length of cross-tie 4'6".*

*Section at cross-tie I, of Fig. 40.*

*Length of cross-tie 4'6".*

*Section at cross-tie J, of Fig. 40.*

*Length of cross-tie 4'6".*

*Section at cross-tie K, of Fig. 40.*

*Length of cross-tie 4'6".*

*Section at cross-tie L, of Fig. 40.*

*Length of cross-tie 4'6".*

*Section at cross-tie M, of Fig. 40.*

*Length of cross-tie 4'6".*

*Section at cross-tie N, of Fig. 40.*

*Length of cross-tie 4'6".*

*Section at cross-tie O, of Fig. 40.*

*Length of cross-tie 4'6".*

*Section at cross-tie P, of Fig. 40.*

*Length of cross-tie 4'6".*

*Section at cross-tie Q, of Fig. 40.*

*Length of cross-tie 4'6".*

Fig. 40. General Plan.

*of three throw points*

*Paris, Lyons, and Mediterranean R?*

*Plan*

*Section at cross-tie C, of Fig. 40.*

*Length of cross-tie 4'6".*

*Section at cross-tie B, of Fig. 40.*

*Length of cross-tie 4'6".*

*Section at cross-tie A, of Fig. 40.*

*Length of cross-tie 4'6".*

*Section at cross-tie D, of Fig. 40.*

*Length of cross-tie 4'6".*

*Section at cross-tie E, of Fig. 40.*

*Length of cross-tie 4'6".*

*Scale - Fig. 1, 2, 23, and 38.*

*Fig. 3 to 8, 11 to 20, 24, 26 to 33, and 37.*

*Fig. 9, 10, 34, and 35.*

*Fig. 21 and 22.*

*Fig. 35.*

*Fig. 39 and 40.*

*Fig. 39 and 40.*

*Fig. 39 and 40.*

*Fig. 39 and 40.*

*Fig. 39 and 40.*

*Fig. 39 and 40.*

*Fig. 39 and 40.*

*Fig. 39 and 40.*

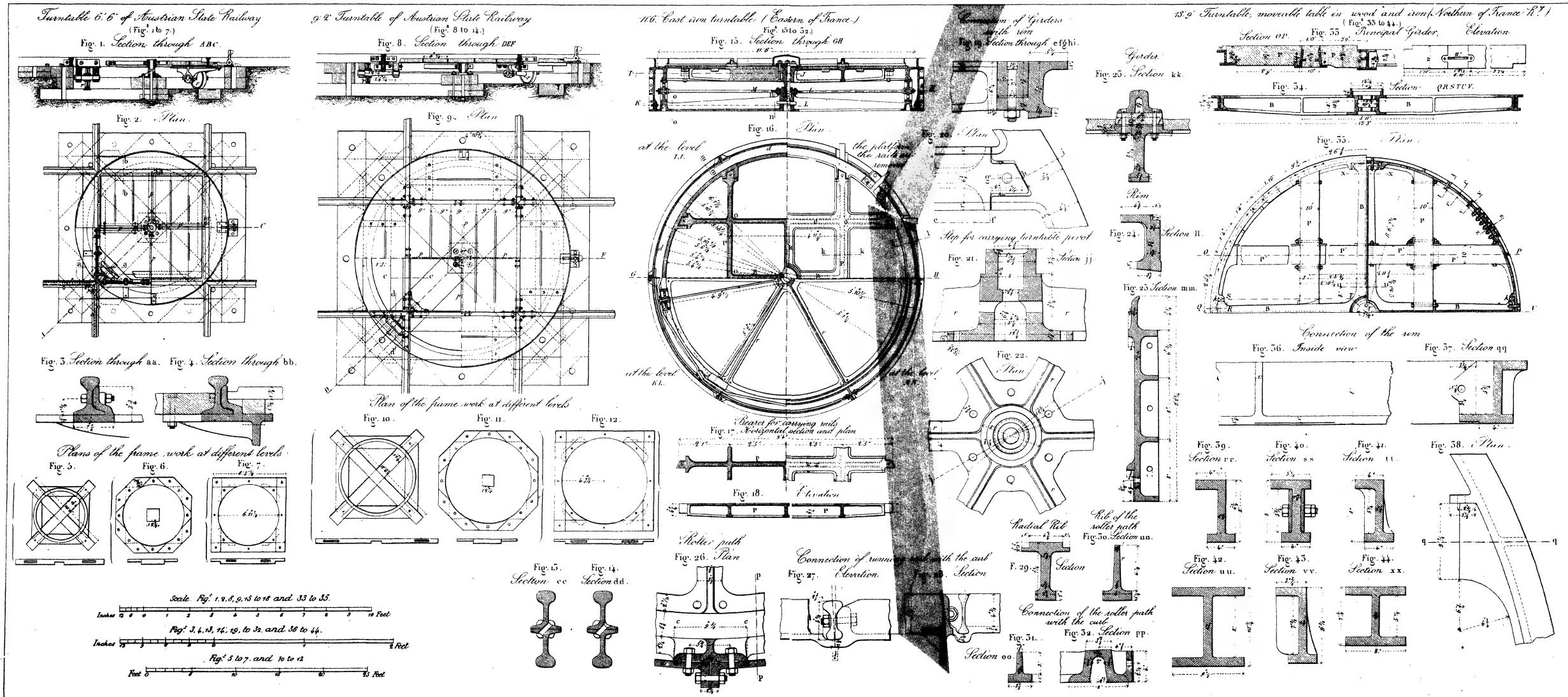
*Fig. 39 and 40.*

*Fig. 39 and 40.*

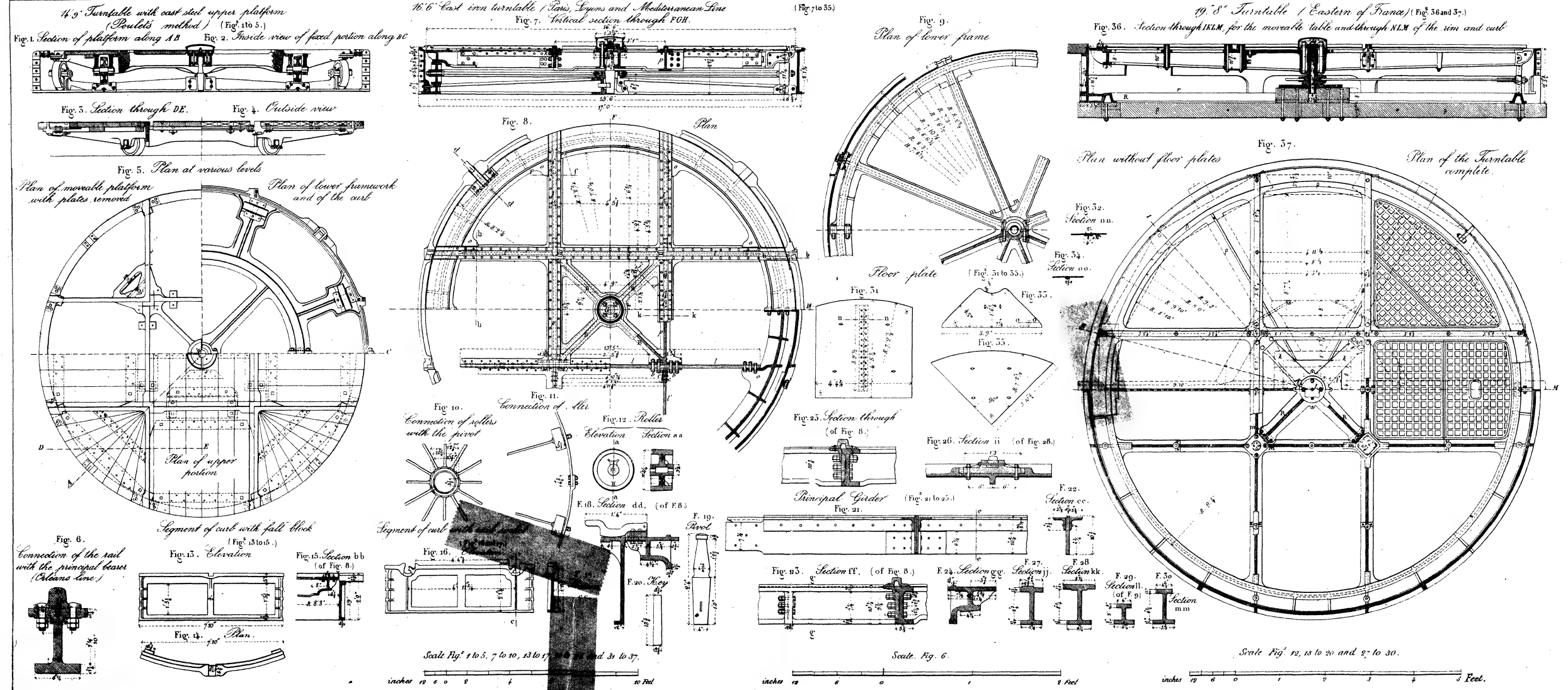
*Imprimerie Goussier.*













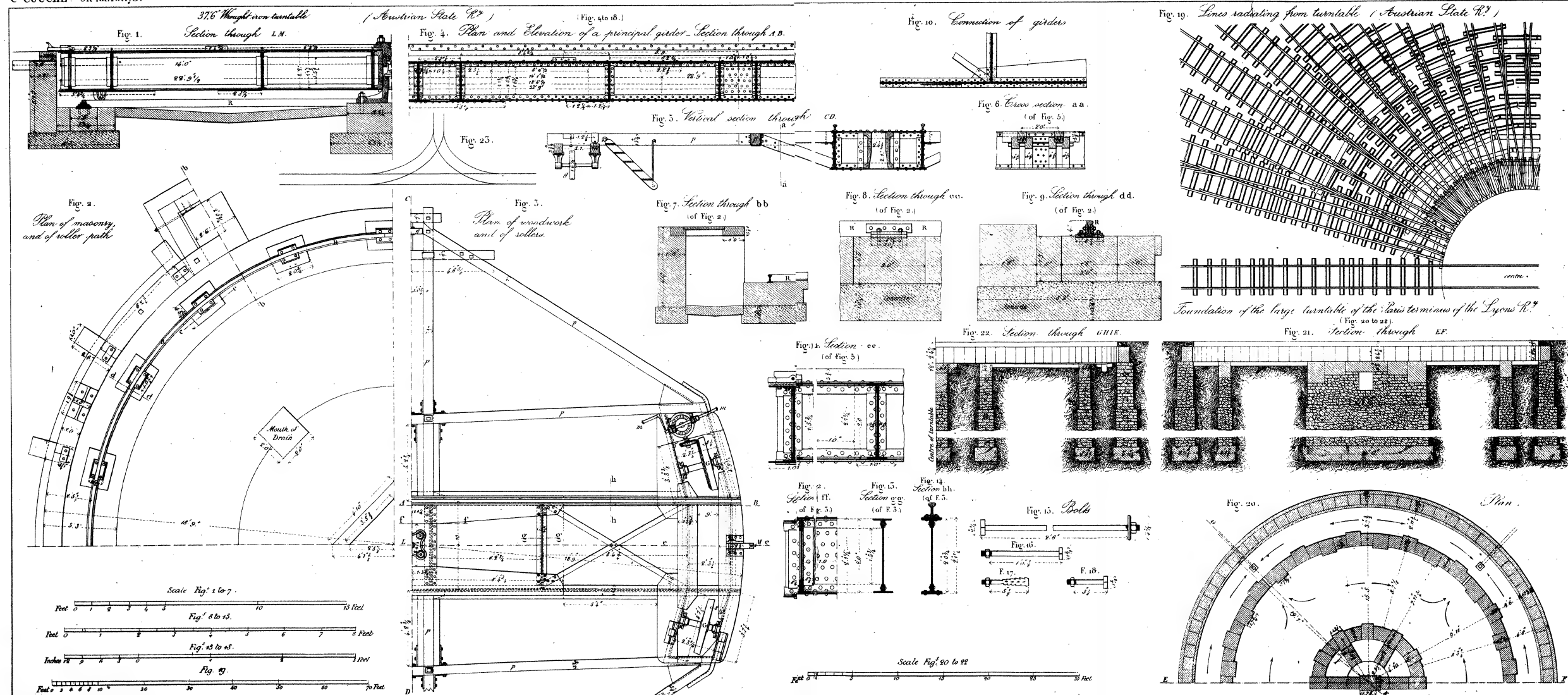
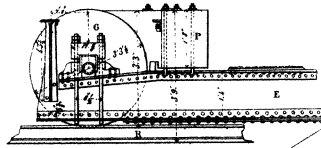




Fig. 4. Elevation of large roller



38.0' Turntable. - Eastern of France

Fig. 1. Plan, at different levels

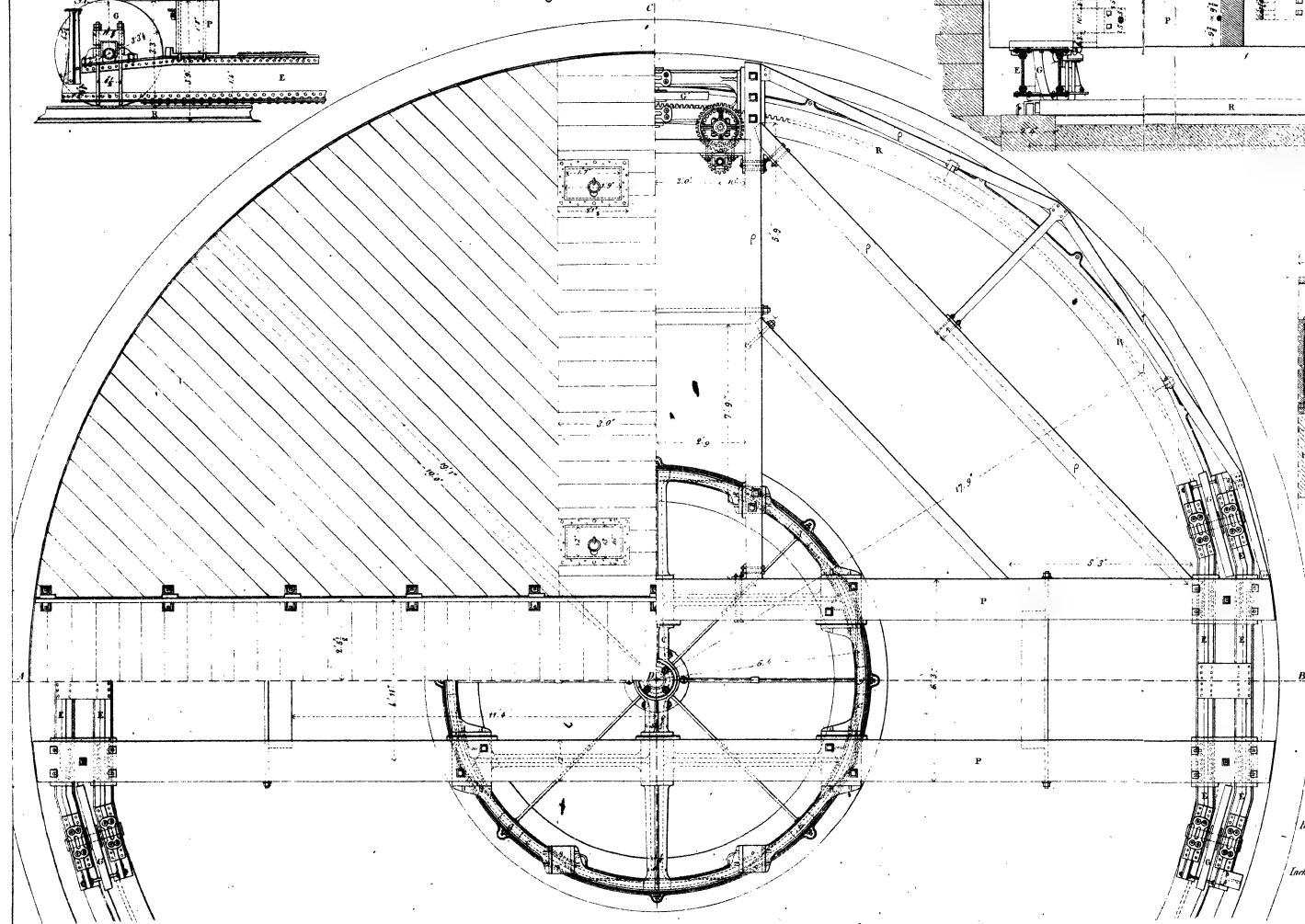


FIG. 2. Vertical section through AB.

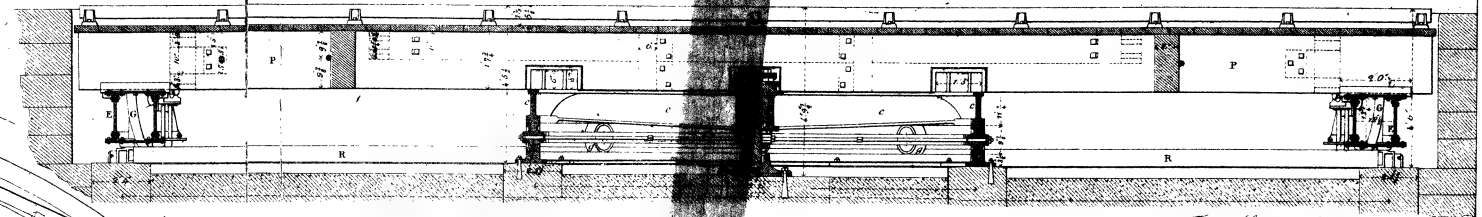
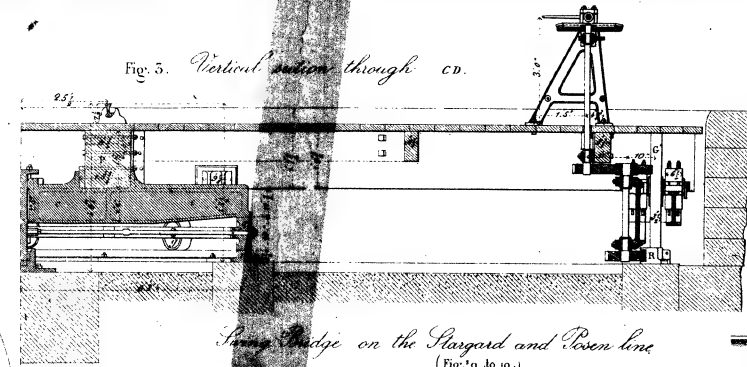


Fig. 5. Vertical section through *cd*.



Turntable as altered  
at Châlons-sur-Maine (Fig. 5 to 8).

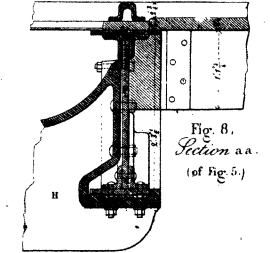


Fig. 6. Section through EF.



Fig. 7. *Section through, 6π.*

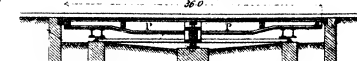
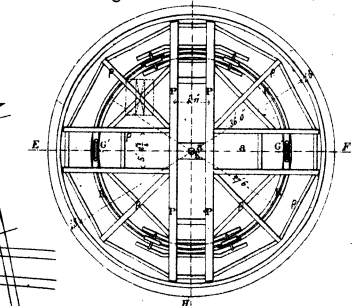


Fig. 5. *61 Plan.*



Spring Bridge on the Hargard and Posen line  
(Fig. 9 to 10.)

Fig. 9. Vertical section

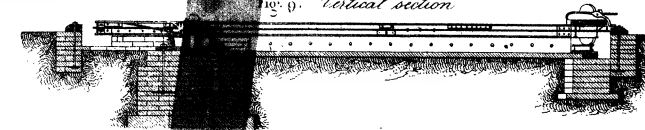
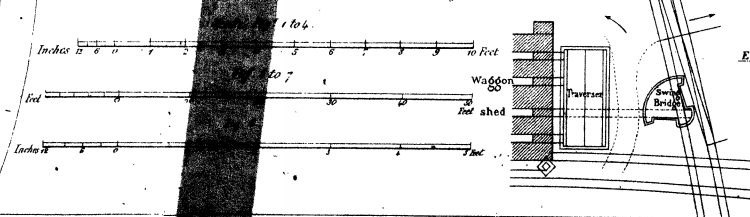


Fig. 10.  
General Plan.







Turntable at the new carriage shed of the Berlin Station of the Potsdam and Magdeburg R.R. (Fig. 1 to 5.)

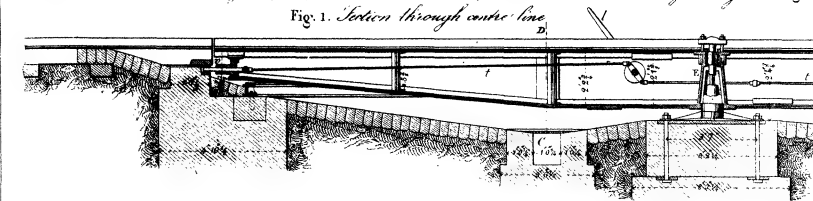


Fig. 1. Section through curve line

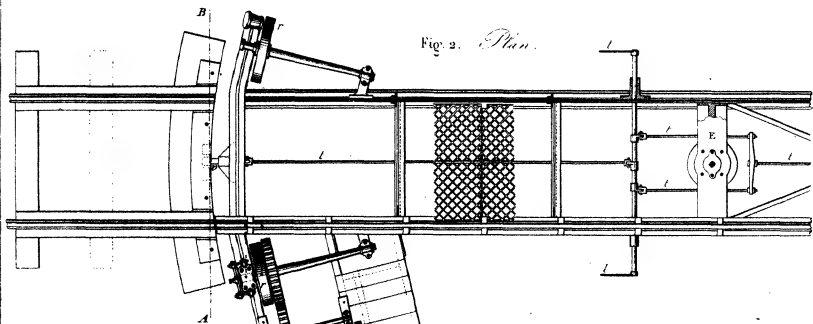


Fig. 2. Plan

Fig. 3. Section through AB

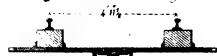


Fig. 4. Front

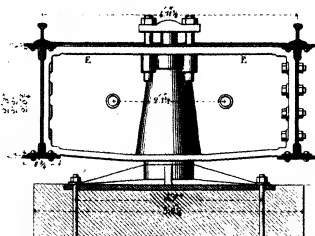
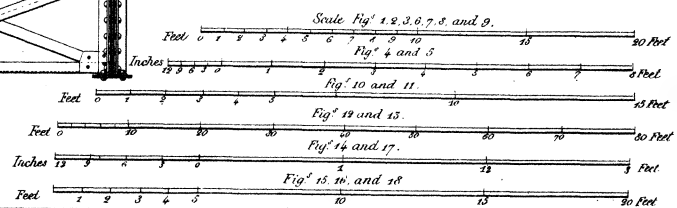
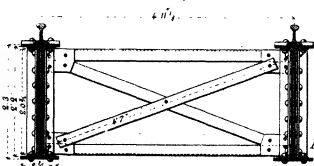


Fig. 5. Section through CD



56' 0" Turntable (Northern of France R.R.) (Fig. 6 to 18.)

Fig. 6. Elevation

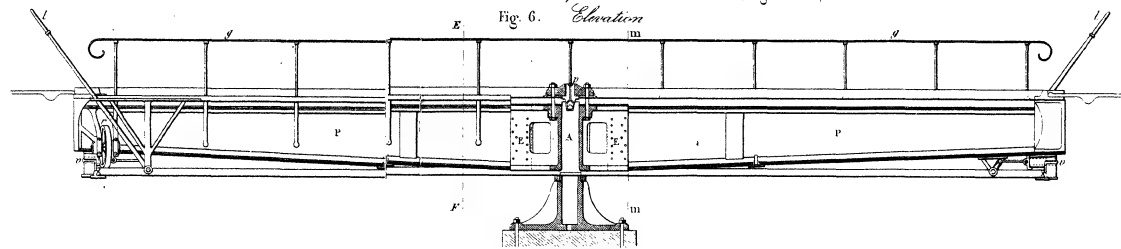


Fig. 7. Plan

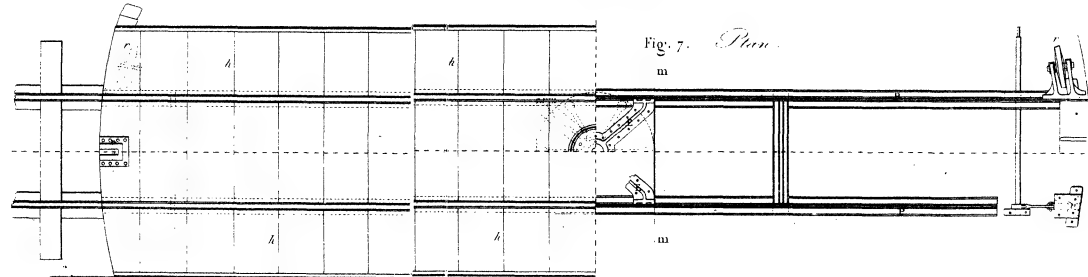


Fig. 10. Elevation

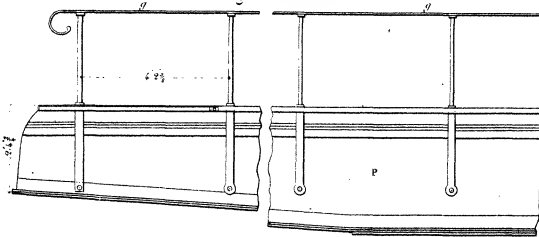


Fig. 11. Plan of the Platform

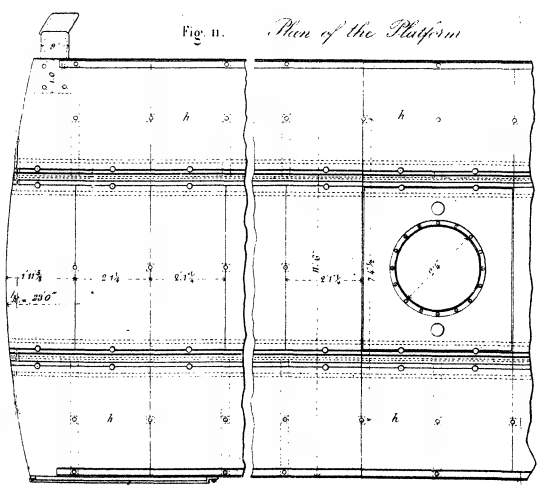


Fig. 14.

Step bar of working lever

Wrought frame to edge of pit

Fig. 15. Section through GH

Fig. 16. Plan

Fig. 17. Section through IJ

Fig. 18. Details of foundations of outside wall

Fig. 19. Section through KL

Fig. 20. Section through MN

Fig. 21. Section through OP

Fig. 22. Section through QR

Fig. 23. Section through ST

Fig. 24. Section through UV

Fig. 25. Section through WX

Fig. 26. Section through YZ

Fig. 27. Section through AB

Fig. 28. Section through CD

Fig. 8.

View at end.

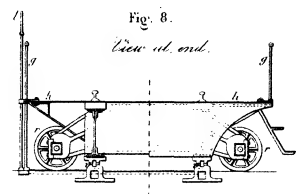


Fig. 9.

Section EF

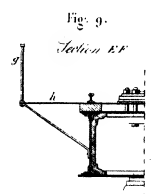


Fig. 12. Section through axes



Fig. 13.

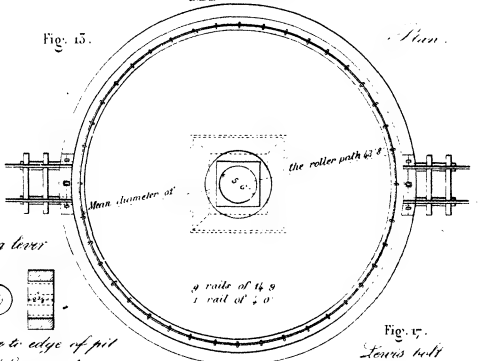


Fig. 17.

Levers built

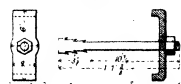
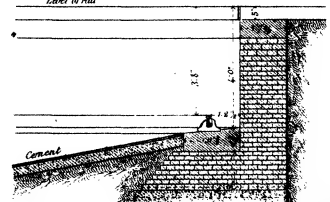


Fig. 18. Details of foundations of outside wall





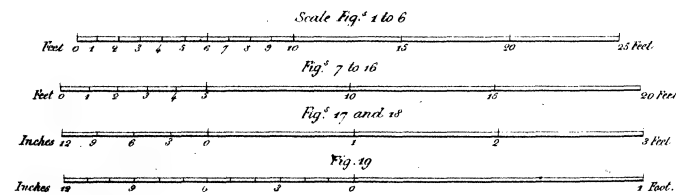
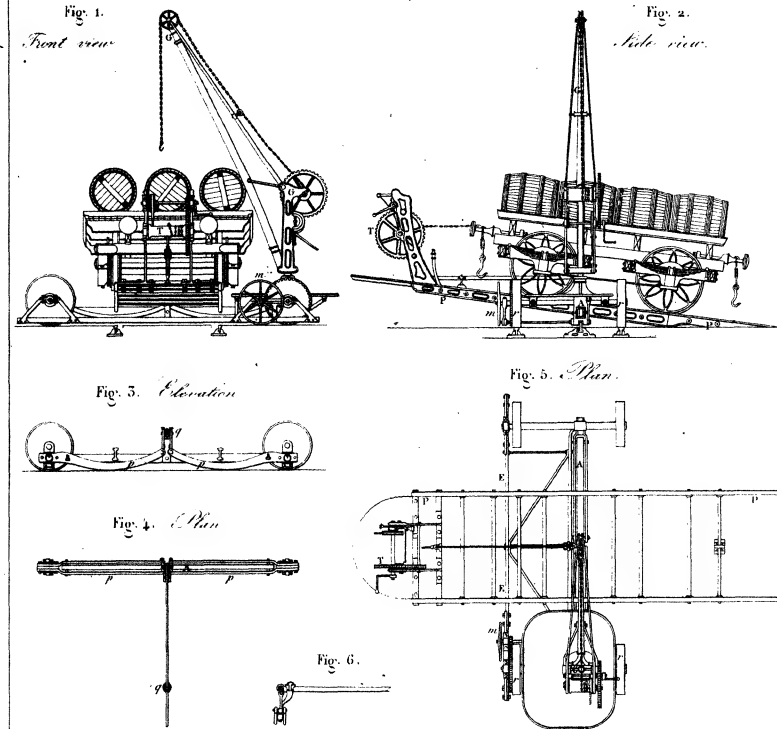
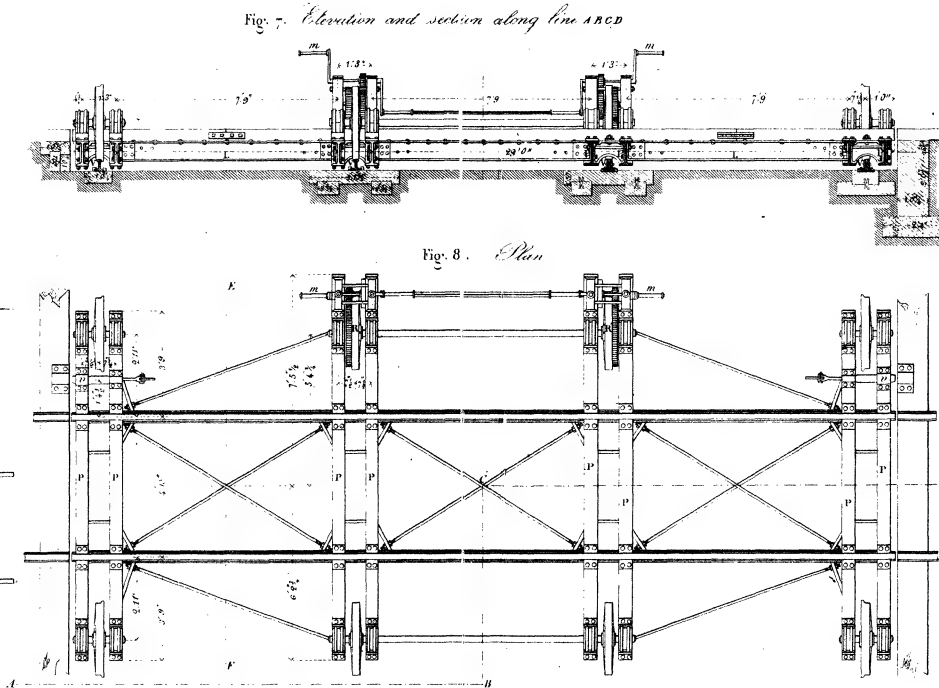
*Highbridge Traverser, as proposed in Belgium*(Fig.<sup>s</sup> 1 to 6.)*Traverser of the Austrian state lines*(Fig.<sup>s</sup> 7 to 10.)*Four-axled Traversers for Huggons, weighing when loaded from 15 to 20 Tons.  
Paris and Mediterranean line. (Fig.<sup>s</sup> 11 to 19.)*

Fig. 11. Section through ONIK.

Fig. 12. End elevation

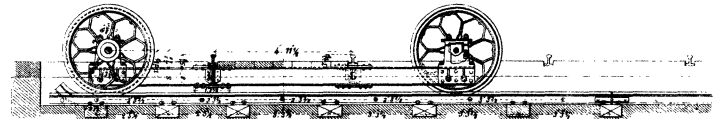


Fig. 13. Plan

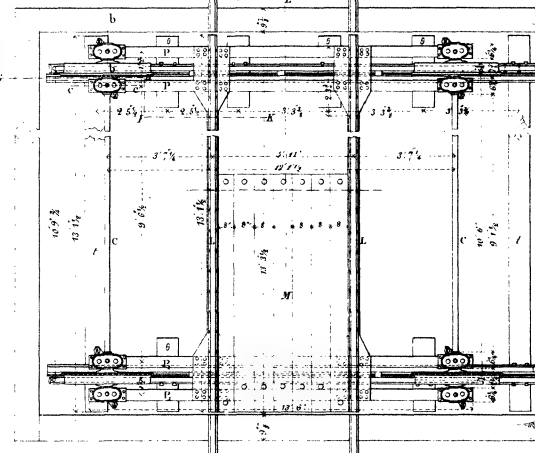
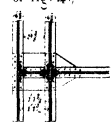
Fig. 16.  
Section through aa  
(of Fig. 14.)

Fig. 14. Section through LM.

Fig. 15. Elevation.

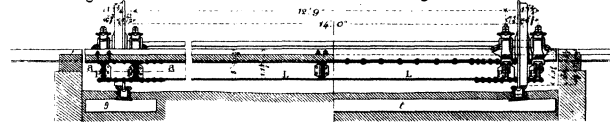
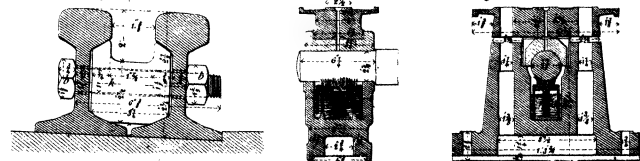


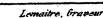
Fig. 19. Section, weighing 7 1/2 lbs.

Fig. 17. Section through bb. (of Fig. 13.)

Fig. 18. Section through cc. (of Fig. 13.)





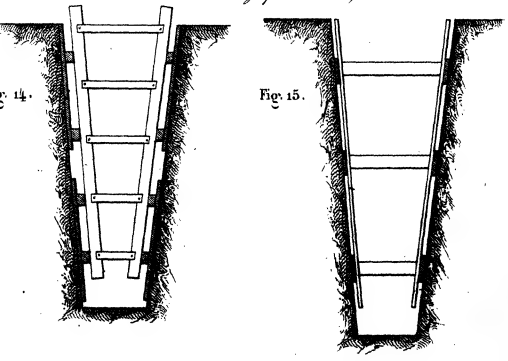




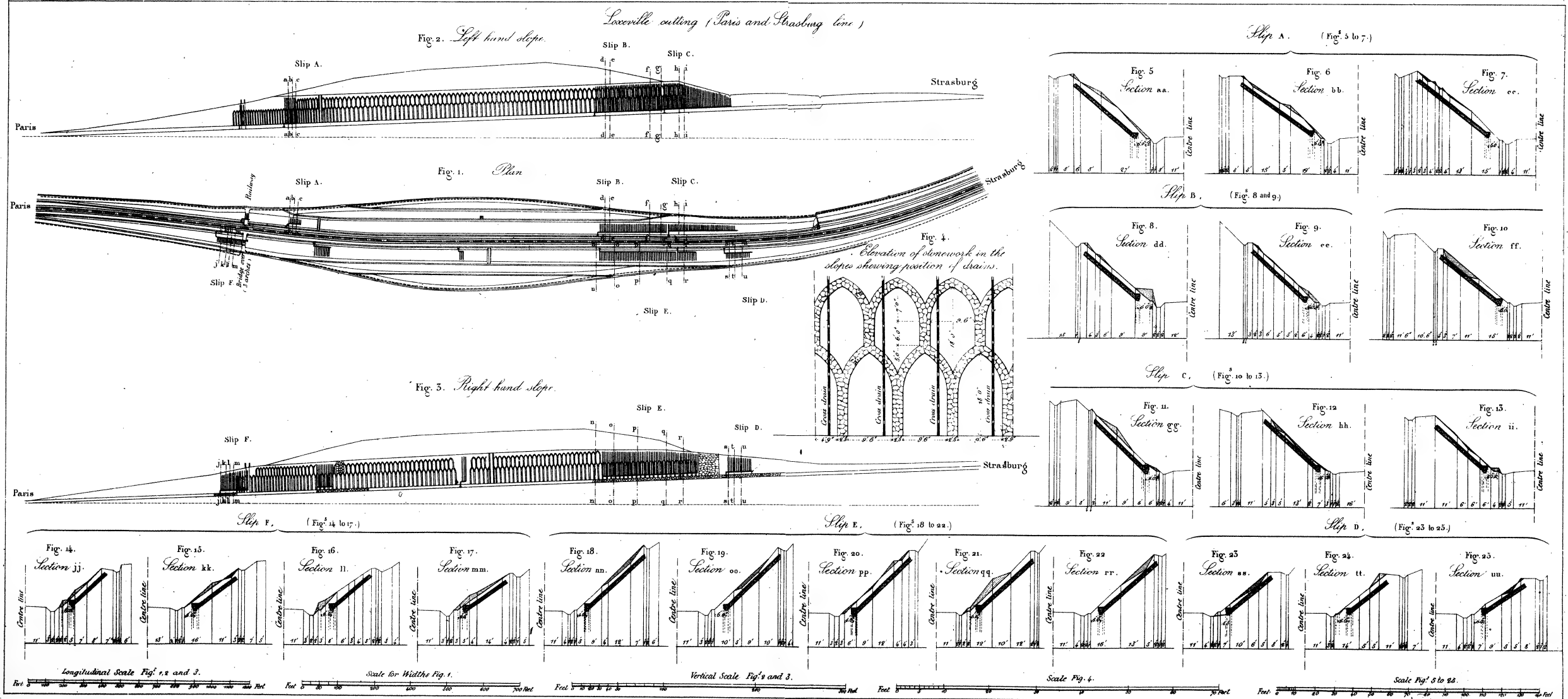






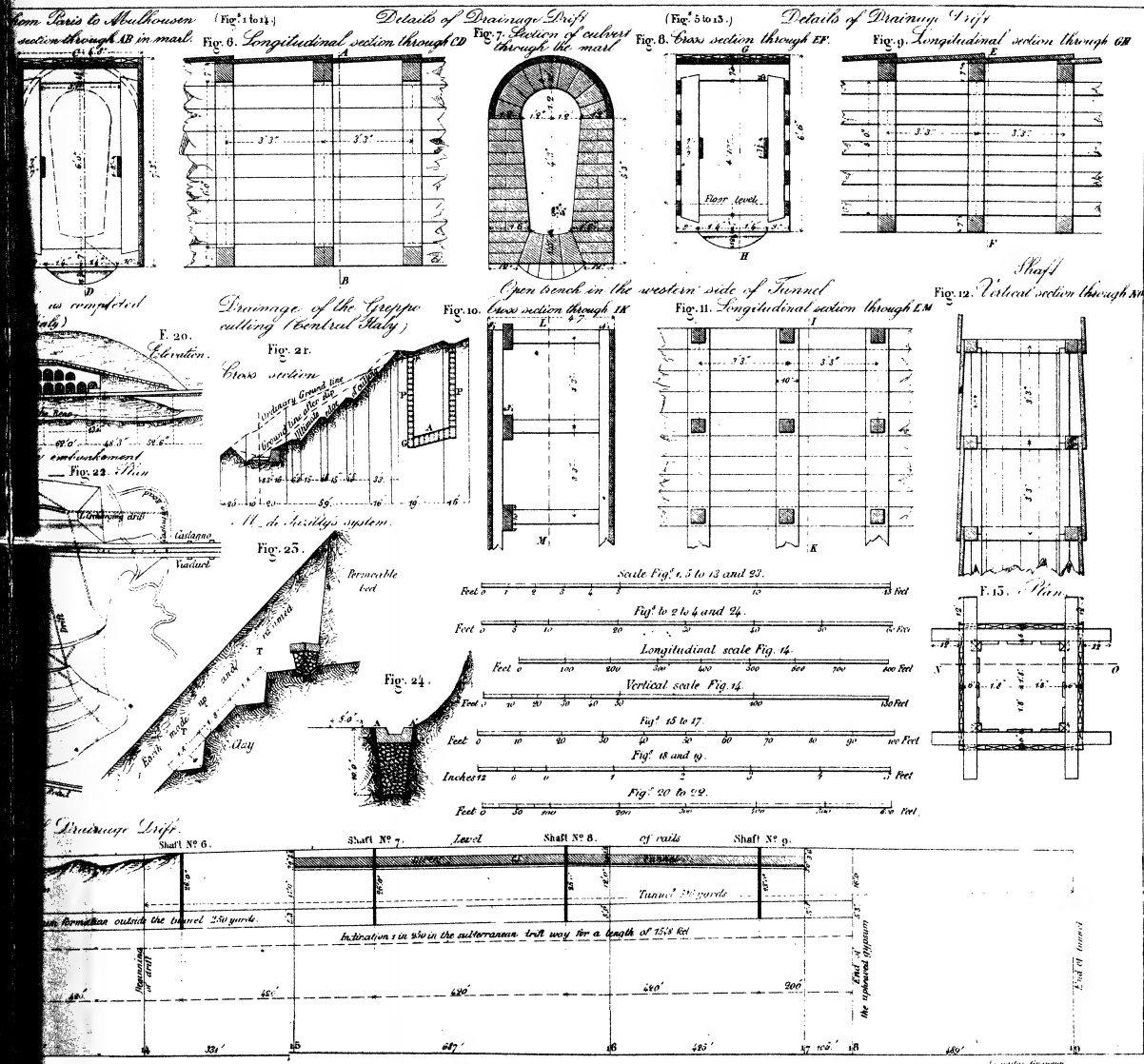
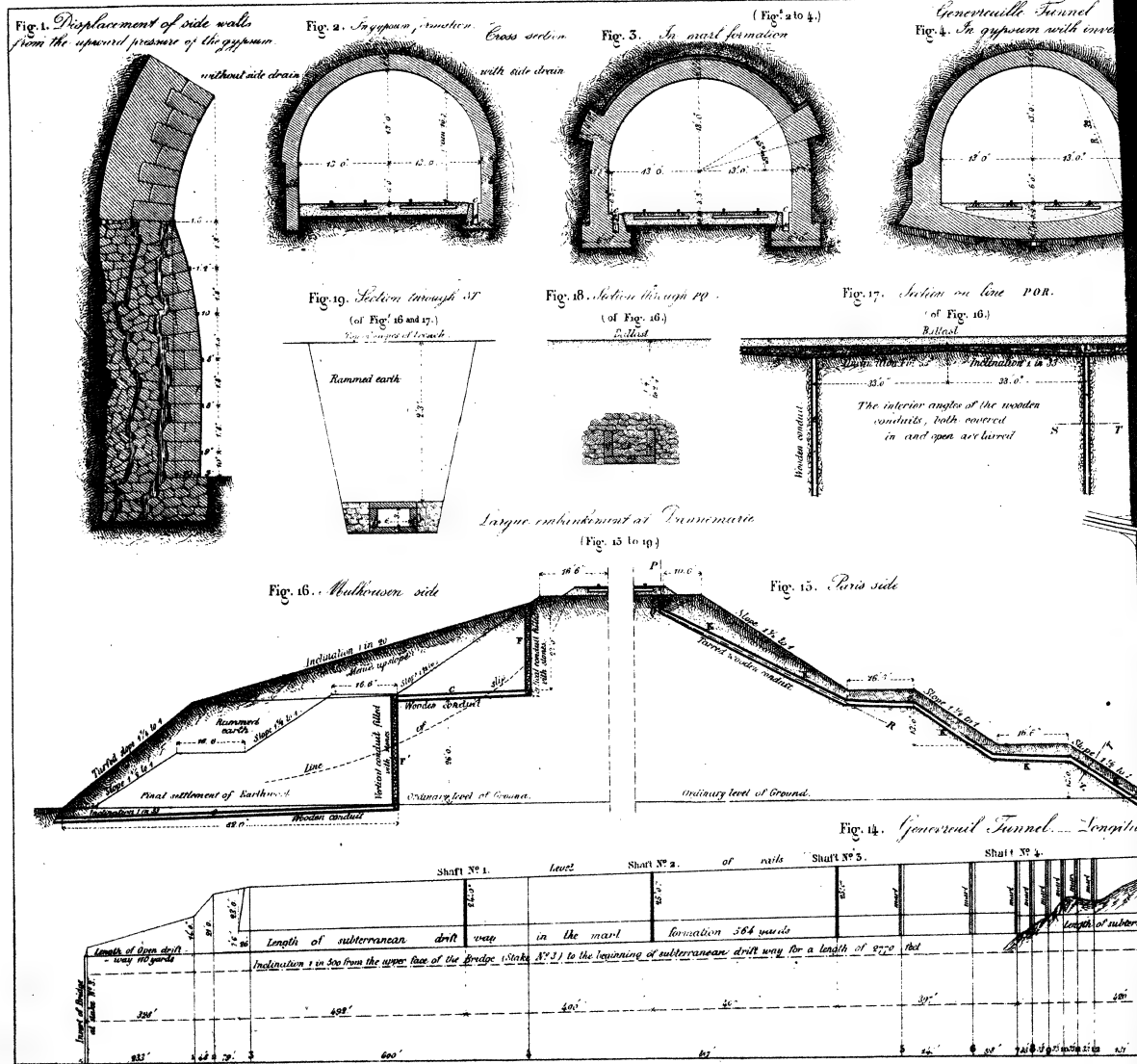






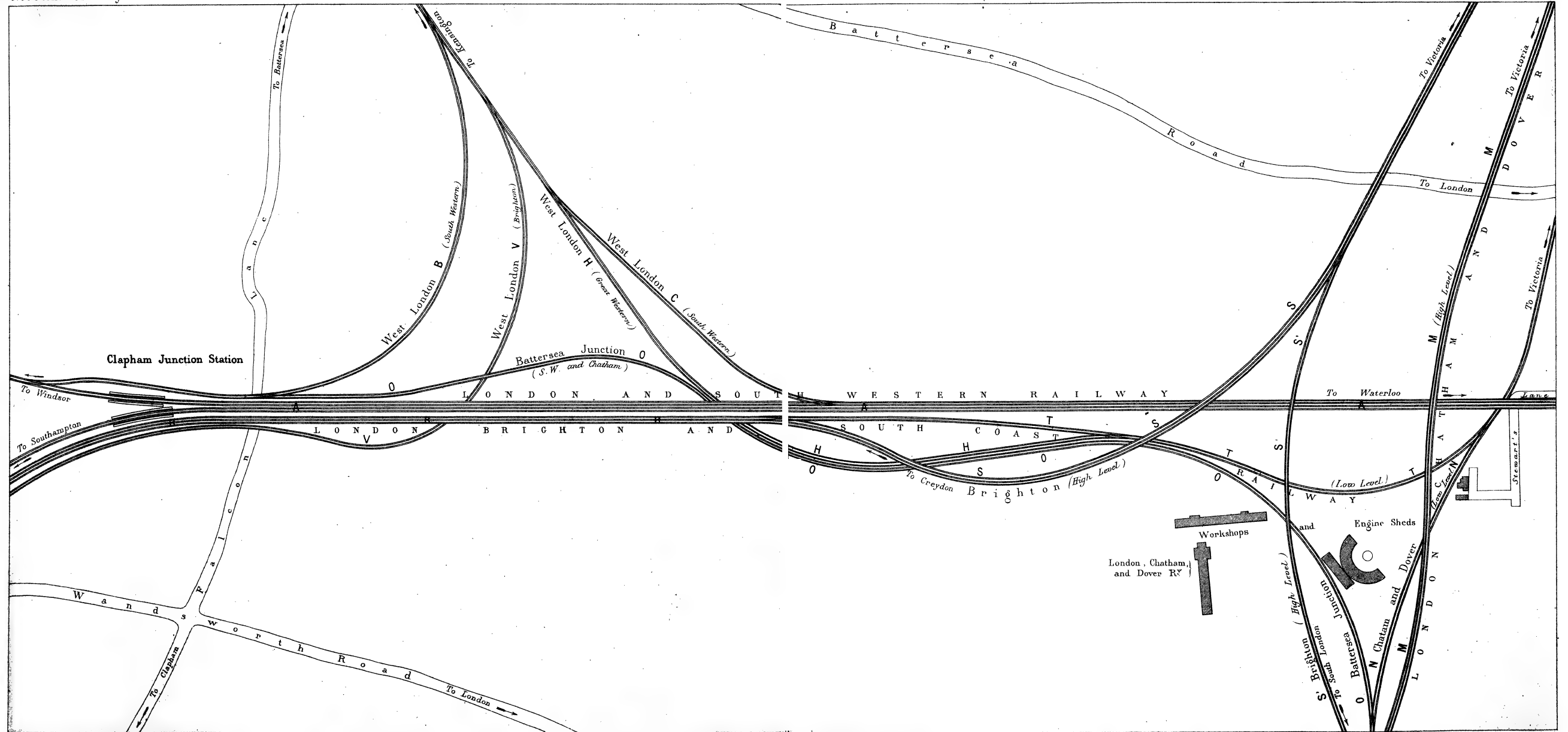


C. COUCHE, On Railways





## c







Saxby and Farmer's

(Fig<sup>s</sup> 3 to 5.)

Fig 5. Locking Plates.

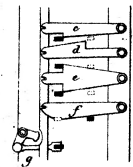
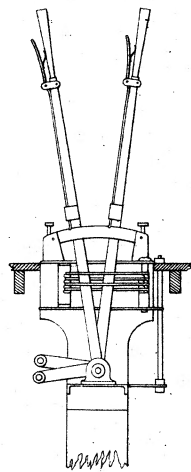
Fig 4.  
Side View

Fig 3. Elevation

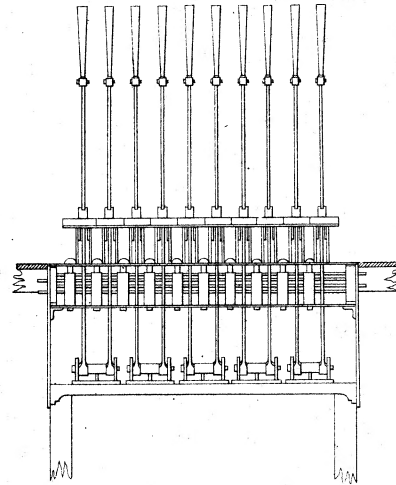
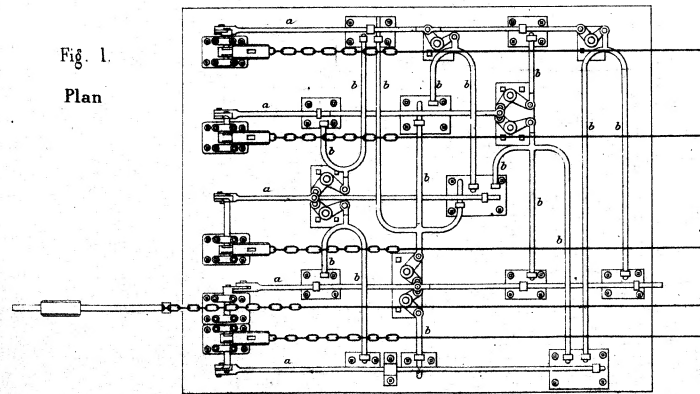
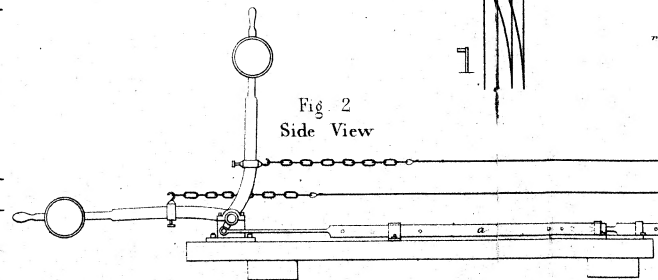
Fig. 1.  
PlanVignier's  
(Fig<sup>s</sup> 1 and 2.)Fig 2  
Side View

Fig 13.

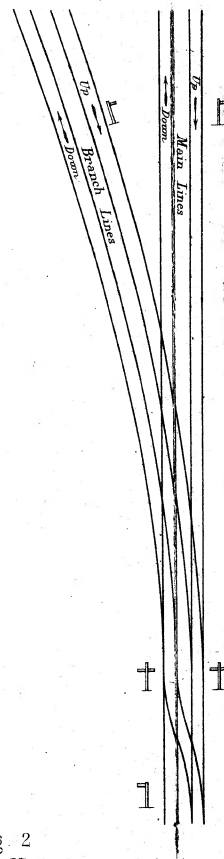


Fig 6. Elevation

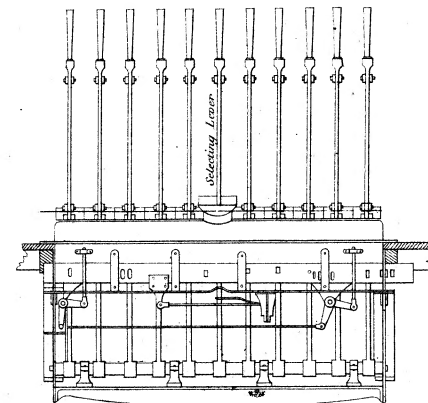
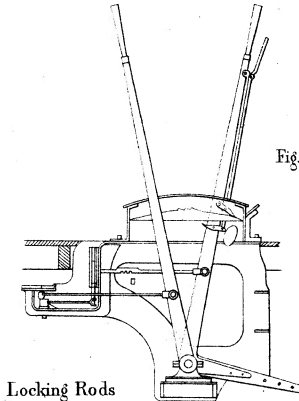
Fig 7.  
Side ViewAnderson's  
(Fig<sup>s</sup> 6 to 9.)

Fig 8. Index Plate Enlarged

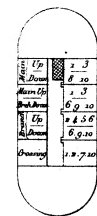


Fig 9. Locking Rods



Skinner's

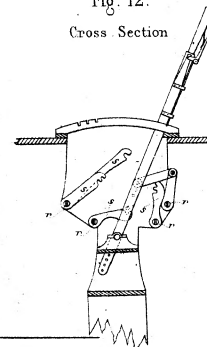
Fig 12.  
Cross Section

Fig 10. Elevation

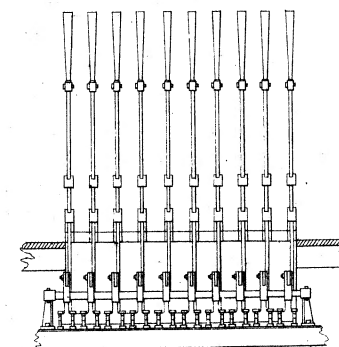
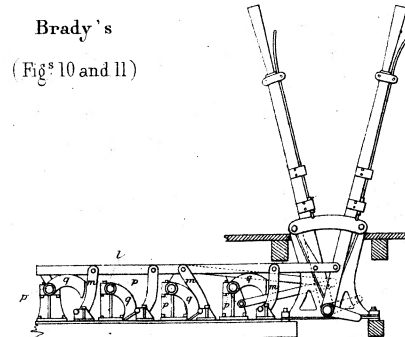
Brady's  
(Fig<sup>s</sup> 10 and 11)

Fig 11. Side View

Scale —  $\frac{1}{2}$  Inch to one foot Fig<sup>s</sup> 1 to 12 (excepting 8.)



Fig. 17.  
--IL RAILS -- BARROW STEEL COMPANY  
Relation of Punching Tensile and Bending Strains  
to the Percentage of Carbon.

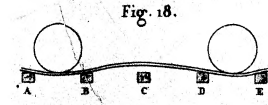
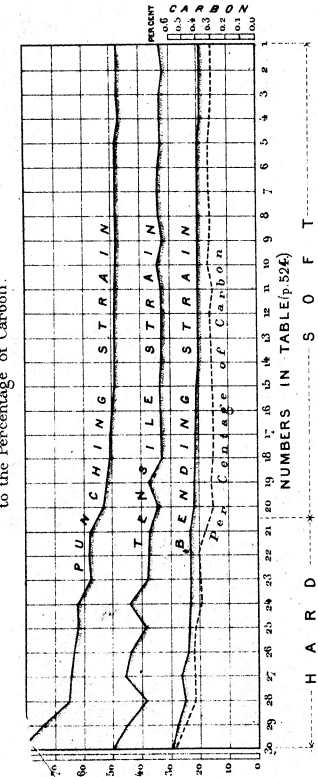


Fig. 1. Movable-rail Switch in use in the United States.

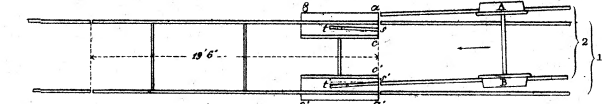


Fig. 2.

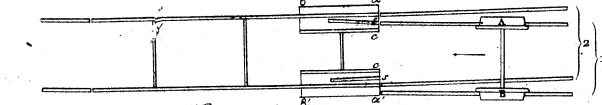


Fig. 3. Wharton Switch.

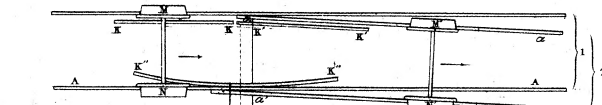
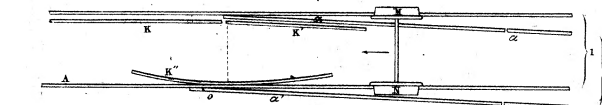
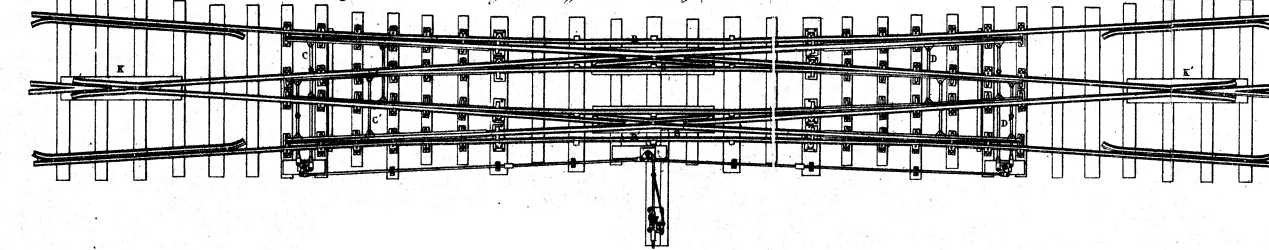


Fig. 4.



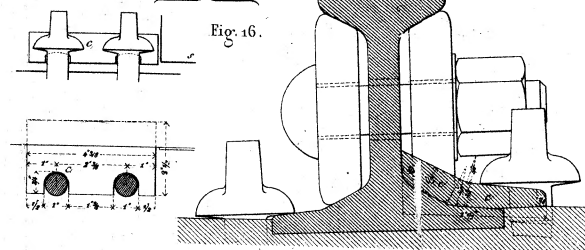
Scale Fig. 1 to 4 and 11.

Fig. 11. German Through crossing, called 'Engelsche Weiche'.



Scale Fig. 12 and 13.

Disposing with notching the foot of the Bessemer rail.



Scale Fig. 5 and 14.

Fig. 12. Improved form of iron Permanent-way of Herr Kell.

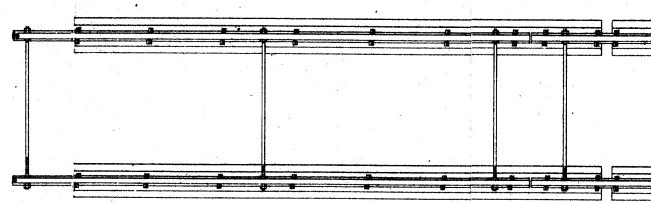


Fig. 5. Ordinary Fishplate.



Improved Fishplate.

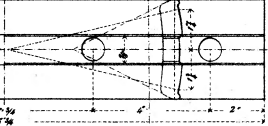


Fig. 8.



Fig. 6. Northern of Fish-plate.

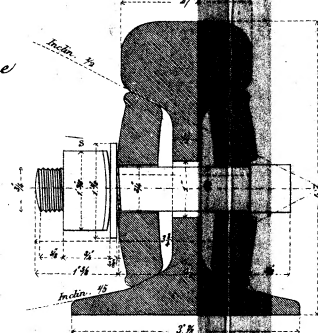


Fig. 7. From Stop fishplate for steel end of track before to Goodland R.R.

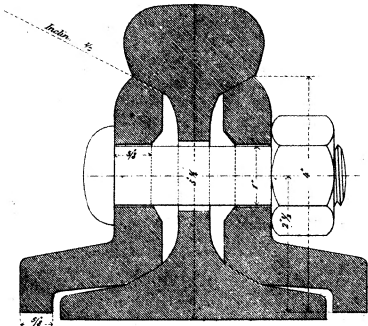
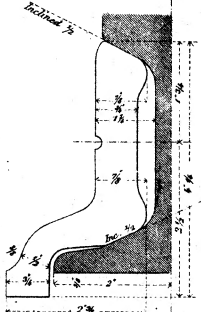


Fig. 9. 1/2



Stop fish plate. PLM.

Fig. 10. 3/4 Scale.

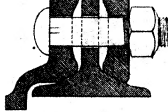


Fig. 13. Cross Section.



Fig. 15.

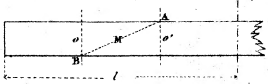


Fig. 14. Improved form of iron permanent-way.

